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MONTHLY NOTICES

OF

PAPERS & PROCEEDINGS

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR

1868.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.

1869.

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ERRATA.

Page 7. –Third line from bottom, for "Ireside" read "I reside."

Page 7 and 8.—The second, third, and fourth paragraphs of Dr. Mueller's paper should have been placed between inverted commas.

Page 9.—Eleventh line from bottom, for "romeriformis" read "vomeriformis."

Page 10.—Fifth line from top, for "Phryptomene" read "Thryptomene."

Page 10.—Tenth line from bottom, for "Leptorrynehus" read "Leptorrynchus;" and for "Les's Oyn" read "Less. synops."

Page 10.—Next line, for "Les's" read "Less."

Page 12.—Seventh line from top, for "literal" read "litoral."

Page 12—Twenty-fifth, twenty-seventh, and twenty-ninth lines from top, for "Lypiranthus" read "Lyperanthus."

Page 19.—Ninth line, first paragraph, for "ludochrome" read "endochrome."

Page 22.—Thirty-first line, for "dug up" read "dried up."

Page 23.—Sixth line, second column, for "1 U.S." read "1 n. s."

Page 23.—Tenth line of ditto, for "Auhistrodesmus" read "Ankistrodesmus."

Page 24.—Last column of table, at bottom, for "14·67" read "10·21."

Page 24.—Ninth column of table, at bottom, for "67·33" read "67·23."

Page 24.—Second column of table, at bottom, for "29·931" read "29·981."

Page 40.—Eighth line from bottom, for "States" read "State."

Page 46.—Twenty-first line, for "Microscope" read "Spectroscope."

Page 49.—Meteorological table, in the maximum and minimum of air columns, for the figures printed, read as follows :—

Max. of air.	Min. of air.
°	°
63	31
64	30
66	32
64·3	31·3

Page 79.—Lines ten and eleven from bottom should read thus :—"Society Zoological of London, Transactions of, Vol. 6, Part 6, Osteology of Sperm Whale."

ROYAL SOCIETY.

MARCH, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 24th March, J. Barnard, Esq., in the chair.

Mr. William Knight, jun., who had been previously nominated by the Council, was after a ballot duly elected as a Fellow of the society.

Mr. M. Allport (on behalf of the Secretary, Dr. Agnew,) laid on the table the following returns :—

1. Visitors to Museum, February, 606.
2. Ditto to Gardens, February, 2003.
3. Plants and seeds received at Gardens.—From Mr. C. F. Wren, Auckland, New Zealand, 82 plants, of which 14 were dead on arrival. From Mr. T. Campbell Carey, 16 papers seeds, indigenous to Western Australia.
4. Plants and seeds sent from Gardens.—To A. Werschaffelt, Ghent, Belgium, per Windward, 10 small tree Ferns. To Mr. J. Harriss, Melbourne, 63 plants, 50 papers seeds, 50 varieties of hyacinth, and 24 ditto of ranunculus.
5. Leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Observations.

1. Hobart Town, from F. Abbott, Esq.,—table for February, with summary.
2. Port Arthur, from J. Boyd, Esq.,—ditto for January.
3. Swansea, from Dr. Story,—ditto for February.
4. Westbury, from F. Belstead, Esq.,—ditto for February.
5. Sydney, New South Wales, from G. Smalley, Esq., government astronomer, printed table for January.
6. Lighthouses, &c., viz., Kent's Group, Goose Island, King's Island, Swan Island, South Bruni, Mount Nelson, for the six months ending the 31st December, 1867. From the Marine Board.

The presentations to the Museum were as follows :—

1. From J. L. Smith, Esq., (per M. Allport, Esq.) A curious fish found on the beach at Table Cape.
2. From R. D. Lord, Esq., Oatlands. A pair of mountain ducks *(Casarca tadornoides)*, prepared for mounting.
3. From Miss Sharland. A Kingfisher *(Alcyone azurea.)*
4. From A. H. Maning, Esq. A White Hawk *(Astur Novæ Hollandiæ)*, Shot at Sandy Bay.
5. From Mr. Young, Prince of Wales Bay, Glenorchy. A Petrel.

[With reference to this presentation Mr. Allport stated that the bird was taken at the time Mr. Young's premises were destroyed by fire. Being probably attracted by the light it flew through the flames and was picked up alive. Mr. Allport further remarked that it was unusual to find these birds so far inland although they were frequently seen off the coast.]

6. From J. Boyd, Esq., Port Arthur. Veneers of 28 varieties of Tasmanian woods, mounted and polished. These specimens were prepared for the Paris Exhibition, and shew in a striking manner the great beauty of many of the Tasmanian woods, and their value for ornamental purposes.
7. From T. Ashworth, Esq., Bath, per J. A. Youl, Esq. Five full sized diagrams representing salmon and trout captured in the Severn and Tay, and at Galway.

Mr. M. Allport read the following letter from Dr. F. Mueller, of the Melbourne Botanic Gardens, which had been received by the Secretary, Dr. Agnew:—

"Melbourne Botanic Gardens,
"7th January, 1868.

"Allow me, dear Dr. Agnew, to offer you, as Hon. Secretary of the Royal Society of Tasmania, a few pages of observations on Tasmanian plants. If such contributions should prove acceptable for the Society's publication, I will gladly from time to time offer others, and thus special supplements would arise to Dr. Hooker's work from new material. This single contribution brings already 25 plants left unrecorded by my illustrious friend.

"The impression may thus also be removed that nothing was left to be recorded in Tasmania; thus intelligent and educated observers might feel induced to send methodically and periodically contributions to me for further elucidation of the plants of your islands.

"I long myself to visit King's Island and Flinders' Island, not merely because in those dependencies of Tasmania many a plant will yet be found new to your territory; but more especially with a view of contrasting the vegetation there with that of Gipps Land, and to trace it to its geological relation. The same physiographic enquiries may lead me yet to your Alps; and such excursions may contribute much also to the buoyancy of mind, and the consolidation or restoration of health, all of which I sadly am missing, as I am but partially recovered from my long and severe illness.

"By the next Hobart Town steamer I shall send a number of Chinese tea plants, and others calculated to live in your mild fern-tree glens. If you could afford space and provide a temperature of 80 deg. F., I could send also a plant of the magnificent waterlily, the *Victoria regia.*

"Your very regardful,
"FERD. MUELLER.

"N.B.—I could only send fragments of some of the plants in letter form."

The paper alluded to entitled "Contributions to the Phytography of Tasmania" was then read.

In reference to Dr. Mueller's interesting paper Mr. M. Allport observed that the Fellows of the Society ought to mark in a distinct manner their appreciation of the Doctor's efforts to afford them instruction, and to benefit their Transactions by the contribution of valuable papers such as that he had just had the honor to read. Mr. Allport concluded by proposing that a special vote of thanks should be accorded to Dr. Mueller, which was seconded by Mr. Giblin, and unanimously carried.

Mr. M. Allport next called the attention of the Fellows present to the diagrams of salmon and trout forwarded as a present to the Society by Mr. James A. Youl, and which afforded another proof of the continual interest which that gentleman took in the welfare of Tasmania. In reference to the largest of these figures, which represented a fish weighing 50lbs., the probability was (if the statements of the learned were to be relied on) that the age of this fish was about 10 years, as after the 3rd year salmon are supposed to add about six or seven lbs. per annum to their weight. Of course he (Mr. Allport) had had no opportunities of testing the truth of these statements himself, but judging from the rapid growth of some fresh water fish which he had carefully observed in limited waters, and from circumstances connected with the growth of some of our indigenous sea fish, he had little doubt of their truth. For instance, the kingfish which entered our rivers in summer, occasionally deposit their spawn far up towards the fresh water; on two separate occasions in the autumn he (Mr. Allport) had seen in the mouth of a small creek, near the river Jordan, a shoal of young kingfish from 4 to 8 inches in length, undoubtedly the produce of spawn laid that summer; with the first winter rains these fish disappear seawards, and in the summer following none but full grown kingfish are found, weighing from 12 to 15 lbs. The fish of intermediate size are never seen, and (though this is but negative evidence), the conviction was therefore strong in his mind that the kingfish grew from the egg into 12 lbs. weight in a single year. Amazing as this seems at first, it is not to be so greatly wondered at when we remember the voracity of these fish, and that their power of assimilating food is equal to their voracity. If one sea fish grows at this rate, it is but reasonable to suppose that many others also increase rapidly, and when we reflect that they are subjected to the attacks of innumerable enemies, is it not clear that the very existence of some species must depend in a great measure upon the rapidity of their growth? If it is true that many of our sea fish become rapidly marketable after spawning it is quite certain that very slight protection afforded to them on and near to the spawning places would prevent the utter eradication which has for a long time threatened many species. Unless something is done in this direction we shall sooner or later have to deplore the loss of valuable fish, which a little well directed care might now preserve for all time.

Dr. Butler mentioned that certain blue books containing reports on the salmon and other fisheries of the United Kingdom had recently been received from England, and were now in the Parliamentary Library. He thought it very desirable that all available information on the subject should be placed at the disposal of the Society, and moved that the Council be requested to apply to Government for the books referred to.

Mr. Giblin seconded, and the motion was carried.

A long and interesting conversation ensued as to the present state of the fisheries of the island, and the want of protection being extended to them. Several of the Fellows pointed out the want of some such system of protection, especially for the oyster fisheries, as is observed elsewhere. Mr. Davies moved, and Dr. Butler seconded, that a committee consisting of Messrs. T. Giblin, M. Allport, and H. J. Buckland be appointed for the purpose of enquiring generally into the state of the fisheries of Tasmania, including the oyster fisheries, such committee to bring up a report in order that some action may be taken by the Society to move the Government or Parliament in the matter. The motion was agreed to, and the usual vote of thanks having been accorded to the donors of presentations the meeting terminated.

APRIL, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th April, J. Barnard, Esq., in the chair.

Dr. W. O. Sonder, Foreign Hon. Secretary of the Society of Naturalists, Hamburgh, who had been previously nominated by the Council, was after a ballot declared to be duly elected as a Corresponding Member of the Society.

The Secretary, Dr. Agnew, laid on the table the following returns for the past month, viz.:—

1. Visitors to Museum, 500.
2. Ditto to Gardens, 2071.
3. Plants, &c., received at gardens. From Mr. J. Harriss, Melbourne, 1 case containing 47 plants.
4. Plants, &c., sent from Gardens.—To Mr. R. Henderson, Sydney, a collection of bulbs.—To Messrs. Taylor and Sangster, Melbourne, a collection of bulbs, and 29 papers of seeds.—To Messrs. Handasyde and Co., Melbourne, a collection of bulbs, and 62 papers of seeds. To. Dr. R. Schomburgh, director of Botanic Gardens, a collection of bulbs and 29 papers of seeds.
5. Times of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.– Table for March, with summary of observations.
2. Port Arthur, from J. Boyd, Esq.—Table for February.
3. Swansea, from Dr. Story.—Ditto.
4. Westbury, from F. Belstead, Esq.—Table for March.
5. Sydney, from G. R. Smalley, Esq., Government Astronomer.—Table for February.

The presentations were as follows:—

1. From Mr. T. Oldham, specimen of the spur-winged Plover *(Lobivanellus lobatus)*, shot at Sorell.
2. From Mr. G. W. Rex, specimen of the hoary-headed grebe *(Podiceps poliocephalus.)*
3. From M. Allport, Esq., specimens of fish *(Galaxias sp.)* from Great Lake, Tasmania, native freshwater Perch, English Perch from this year's ova, and a Sawfish.

Mr. F. Abbott read a paper entitled "Some continued observations on the variable star η Argus and the surrounding nebula."

This paper was illustrated by a drawing of the object taken at three different periods from 1834-7 to February, 1868. The monographs of Sir John Herschel taken at the Cape of Good Hope, and a record of the star from the time of Halley, 1667, were also laid on the table.

Discussion ensued, and votes of thanks having been accorded to Mr. Abbott, and to the donors of presentations, the meeting terminated.

MAY, 1868.

The monthly meeting of the Fellows was held on Tuesday, 12th May.

The Secretary informed the meeting that His Excellency the President intended to be present this evening, but was accidentally prevented by the arrival of H.M.S. Virago, which necessitated his presence at Government House.

The following returns were laid on the table :—

1. Visitors to Museum during April, 466.
2. Ditto to Gardens ditto, 1,578.
3. Plants received at Gardens :—From Mr. R. Henderson, Sydney, 21 plants. From Mr. C. F. Creswell, 64 papers seeds received per overland mail.
4. Plants sent from Gardens :—To A. Verschaffelt, Ghent, 12 tree ferns *(Dicksonia antarctica)*. To Messrs. Taylor and Sangster, Melbourne, 1 case containing 40 plants.
5. Leafing, flowering, and fruiting of a few standard plants at Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for April.
2. Port Arthur, from J. Boyd, Esq., table for March.
3. Swansea, from Dr. Story, table for March.
4. Westbury, from F. Belstead, Esq., table for April.

The presentations to the Museum were as follows :—

1. From J. W. Graves, Esq. An English fox *(Canis vulpes)*, prepared and mounted; two specimens of the Banded Grass Finch *(Poëphila cincta.)*
2. From M. Allport, Esq. Eggs and young of Dog-fish.

[These were the eggs of the common spined Dog-fish of the Derwent, taken from a specimen 4 feet long caught by Mr. M. Allport off the Iron Pot Lighthouse. When fresh taken these would have been admirable objects for microscopic investigation, as the umbilical cord, by which the young fish is attached to the yolk of the egg, is of such a length that it could easily have been placed across the field of the instrument while the fish and egg remained in the water; the circulation through the large vessels would thus have been easily observed. As an instance of the vitality of immature forms of many creatures, these eggs were remarkable, the small fish attached to one of them exhibiting lively motion after being removed from the parent fish, and remaining on the deck of the vessel for nine hours. The smaller blood vessels, spread over the surface of the yolk like rivers on a map, were very clearly shown on these specimens when fresh.]

3. From Salmon Commissioners. A young Salmon Trout *(Salmo trutta)*, found dead in the breeding pond at the River Plenty.
4. From His Excellency Colonel T. Gore Browne. A specimen of the artificial stone of which the new Wesleyan Church at Launceston is built.
5. From Mr. Allison, Oatlands, two Black Magpies. *(Strepera fuliginosa.)*
6. From Mr. G. Joseph, Single Hill, a Coot. *(Fulica Australis.)*
7. From Mr. T. Wise, skull of Seal.
8. From J. Beamont, Esq., specimens of printed and written official documents of the colony, dated 1817, &c.
9. From G. Gellibrand, Esq., sample of Coal from Grey River, New Zealand.

The Secretary read a paper by Mr. E. D. Harrop, of Launceston, "on Desmidiaceæ, with a list of species found in Tasmania." Accompanying it were numerous and very well executed drawings (by the writer) of these minute forms of vegetable life. The paper was listened to with greatest interest, and will appear in the transactions of the society.

In reference to the very able paper of Mr. Harrop, Mr. Allport stated that one very strong argument against the Desmidieæ belonging to the animal kingdom—in which they have by some naturalists been included—was the entire absence of anything like a digestive cavity. Mr. Allport also observed that many, and probably quite new varieties of the Desmidieæ were to be found in the salt swamps of the colony.

Mr. Abbott suggested that Mr. Harrop's paper should be forwarded to the Royal Microscopical Society of London, who he thought would print it in their journal, and at the same time illustrate it by engravings from the drawings. This society could then procure a copy by applying for it.

The Secretary brought forward a communication from Mr. A. Biggs, of Bothwell, "on a method of making microscopic measurements," for which Mr. Biggs claims some advantages over those in general use. As, however, the hour fixed upon for the microscopical soiree was now approaching it was determined that the reading of the paper should be postponed till the next meeting, when it might obtain a more lengthened consideration.

The thanks of the meeting were given to the donors of presentations, and a special vote was accorded to Mr. Harrop for his valuable contribution.

The meeting then terminated, and the Fellows proceeded to the microscopical exhibition in the large room of the museum.

Here a number of microscopes, each supplied with a variety of objects, were collected. Mr. F. Abbott, by means of a powerful standard instrument, brought under notice many exquisite forms of the first order of diatomaceæ, also beautiful specimens of marine plants parasitic upon algæ and zoophytes, together with many other objects of great interest. Mr. Abbott also contributed a large number of enlarged photographs of microscopic objects beautifully executed by Dr. Maddox. Another instrument shown by Mr. Abbott was a dissecting microscope on the plan adopted by the celebrated Darwin, and fitted with a large doublet designed by him and used in all his experiments. Under this power was exhibited a series of metallic objects.

With another instrument of binocular construction Mr. Abbott, junior, shewed a choice series of botanical sections, chiefly colonial.

Mr. Morton Allport contributed one of the most beautiful objects of the evening in the volvox globator, of which the incessant rotatory motion, and delicate traceries were well displayed, and excited general attention.

Mr. W. Stone exhibited rotifers and animalcules from rain and pond water, some of which were magnified to 480 diameters.

Numerous crystals of salts under the varied and beautiful changes produced by polarised light were exhibited by Mr. W. Knight, junr.; and Mr. Napier also shewed many crystals under similar circumstances, together with some forms of minute animal life, such as polyzoa, &c.

Mr. T. Westbrook provided a binocular microscope, and shewed a variety of selected objects.

Mr. Legrand exhibited for the society specimens of Foraminiferæ collected by himself at Sandy Bay—also spores of ferns, which were examined with great interest by most of the visitors present.

The society also furnished an interesting collection of the hair and fur of indigenous animals, also a number of objects illustrative of insect structure, with microscopic photographs, &c.

The meeting broke up about 10 o'clock, when the numerous visitors departed highly gratified with the exhibition, which had been organised *expressly on their behalf.*

CONTRIBUTIONS TO THE PHYTOGRAPHY OF TASMANIA.

[By Fred. Mueller, M.D., F.R.S.]

This brief allusion to some plants, either unrecorded from Tasmania or rare in its territory, refers to contributions gained from various sources. Robert Brown's great treasures furnished some of the data, as will be evident on reference to the universal work on Australian Vegetation, issued by the President of the Linnean Society. Others of the plants were kindly transmitted by Mr. J. Bennett from the British Museum, and gathered by Dr. Jos. Milligan. Some were detected by Mr. Aug. Oldfield, and remained unnoticed in the supplemental contribution, which it fell to my share to furnish for the "Flora Tasmaniæ." A few again were added by Mr. Walt. Bissell, in a recent voyage to the North-east Coast; while I was agreeably surprised to receive from the venerable Dr. G. Story an extensive set of Museum-plants, secured in the Oyster Bay district. From a letter of this gentleman I submit introductorily the following physiographic remarks, which claim in many respects originality:—

This district is a tract of waste, extending from Cape Bernier on the south to Doctor's Creek, or Seymour Coal Mines, on the north; it was formerly known as the District of Oyster Bay, as that bay occupies a considerable portion of the coast-line. At present the south part is in the County of Pembroke, and the other part forms the County of Glamorgan, forming together a coast-line of 80 miles. A strip of land for cultivation extends along the coast, and is backed by tiers of hills that extend westward to the midland districts of the island. The tiers are formed chiefly of basalt (greenstone), in some cases sand stone and the coal formation appears, but the latter is only met with on the coast-line. The Schouten Island and Freycinet's Peninsula have a strip of porphyritic granite on the eastern side, which granite extends to Bicheno. Sandy swamps, replete with plants, occur at intervals along the coast-line, and sandy swamps occur also in the granite formation, but with a different Flora.

Oyster Bay is from 20 to 30 miles in length, and about 15 miles broad. Maria Island lies at its mouth; the Schouten Island and Freycinet's Peninsula form the eastern side; Swansea is at the head of the western side of the bay and Kelvedon (where Ireside) is six miles south of Swansea. The rivers beginning generally south are Sandspit, Prosser's, Little Swanport (which forms a large pond or lagoon previous to entering the sea). Then several creeks, viz., Buxton's, Meredith, Cygnet, and Wye. Then comes the Great Swan River, and over a tier of hills the Apsley. These two form an extensive port 12 miles in length and four or five miles in breadth, and enter the head of Oyster Bay by a common mouth close to Freycinet's Peninsula; the only other river is the Douglas, near the coal mines. I have never collected plants to the north of Douglas River; it is, I suppose, 100 miles from thence to the north-east corner of the island, and the granite formation will be found in some places no doubt, where it is likely the plants allied to those of Gipps Land exist. Our climate is dry and mild, it is reckoned the most salubrious of any district in the island. The rain in 1864 was 31·16in.; 1865, 19·66in.; 1866, 24·99in.; average for the three years, 25·27in.

Like all other parts of Australia, droughts are long and often occur; thus the rivers are swollen torrents in heavy rain and dry beds in summer; their beds are often densely filled with shrubs.

The united collections offered not merely material for extending our knowledge of the range of the species, but they comprised even a number of plants (indicated in the subjoined enumeration by asterisks) not recorded in Dr. Hooker's great work as existing within Tasmanian territory, adding also the genera Euphorbia, Donatia, and Ixiolaena to the described Tasmanian vegetation.

Reserving for the supplemental volume of the Australian Flora more extended notes on these interesting plants, I beg meanwhile to place a succinct record thereon before the Royal Society of Tasmania, in order that residents there, who cherish a desire for promoting scientific objects, may be encouraged to reveal to us still further the rich vegetation which surrounds them. For researches in this direction Tasmania possesses rare advantages, because few spots in the world can boast of possessing so extensive a work on its vegetation as that which ever will remain a monument of Dr. Hooker's genius and of the sedulous zeal of Mr. Ron. Gunn, Dr. Milligan, and Mr. W. Archer.

The advancement of Phytographic labors should be an aim of each country. Without accurate definition of its plants we cannot reduce any observations on their industrial, therapeutic, or economical value to any solid basis, not to speak of the information thus arising as a never-ceasing source of delight, as an ever-elevating inspiration for religious reflection.

**Comesperma defoliatum.*—F. Muell. Plants of Vict. I., 189. Southport, C. St. In external appearance similar to C. calymegum; in internal structure very distinct.

**Gypsophila tubulosa.*—Bois's diagn. plant. Orient. I., 4. Locality as yet uncertain.

**Polycarpon titraphyllum.*—L. fil. Suppl. 116. Swanport, G. Story. This and the preceding plant may not be originally indigenous. In many instances it is now beyond possibility to ascertain which plants are immigrated. Under any circumstances they cannot be excluded from phytographic lists.

**Eriostemon Oldfieldii.*—F. Muell. fragm. phyt. Austr. I., 3. Mount Laperouse, Oldfield. Belongs to the section Phebalium.

Eriostemon Hillebrandi.—F. Muell. in transact. phil. Soc. Vict. I. 10. On granite at Apsley River. G. Story.

Eriostemon virgatus.—A. Cunn. in Hook. Journ. of Bot., II., 417. Swanport, G. Story. The ripe fruit unknown. The plant forms a transit to Boronia.

**Zieria cytieoidis.*—Smith in Rees's Cyclopœd. 4. On granite rocks at Bicheno. G. Story.

Lasiopetalum micranthum.—J. Hok. fl. Tasm. I., 51. Swanport, G. Story.

Lasiopetalum dasyphyllum.—Sieb. in Hook. Journ. II., 404. Flinder's Island and Cape Barren Island, J. Milligan.

Viminaria denudata.—Sin. Exot. Bot. 51 t. 27. This plant is here doubtfully inserted. It was received from Mr. Eng. Fitzalan along with other Tasmanian plants, without note of locality. It is extremely frequent in the coast straits of Victoria.

Desmodium varians.—Endl. Annal. des. Wien. Mus. I. 185. Cape Grim, J. Milligan.

**Acacia penninervis.*—Sieb. in Cand. pr. II., 453. Mount Wellington, Oldfield. This tree is not unfrequent in the subalpine regions of Victoria, and occurs very likely in several other parts of Tasmania.

**Acacia Oxycedrus.*—Sieb. in Cand. pr. II., 453. Sent by Mr. Fitzalan along with other Tasmanian plants. One of the most frequent species on the moor-heaths of Victoria.

Acacia juniperina.—Willd. Oper. Pl. IV., 1049. Swanport, G. Story.

Acacia romeriformis.—A. Cunn. in Hook. Lond. Journ. I., 332. Swanport, G. Story. Snug and Oyster Cove, Milligan.

Geum renifolium.—F. Muell. in Transact. Phil. Vict. Inst. II., 66. Alpine heights in the rear of Macquarie Harbour, Milligan.

Spyridium Lawrencii.—Benth. Flor. Austral. I., 430. Swanport, G. Story.

Spyridium leucophractum.—F. Muell. Fragm. Phyt. Austr., III., 77. Swanport, G. Story.

Spyridium obovatum.—Benth. Flor. Austr. I., 429. Swanport, G. Story.

Cryptandra amara.—Sm. in Transact. Linn. Soc. X., 295, t. 18. Swanport, G. Story.

Kunzea corifolia.—Reichenb. Consp. Regn.Veg. 175.Bicheno, G. Story.

Phryptomene micrantha.—J. Hook, in Kew Miscell., 1853, 290 t. VIII. Sandy granite land at Bicheno, G. Story. Macquarie Harbour, Milligan.

Eucalyptus Globulus.—Labill. Voy. I., 153, t. 13. Flinder's Island, Milligan.

**Euphorbia chamæsyce.*—Linné. Amœn.Acad.115. Swanport, G. Story. This plant ranges from the Mediterranean countries through South Asia, and extends over nearly the whole of the Australian continent. It introduces now for the first time the great cosmopolitan genus Euphorbia into the Tasmanian vegetation.

Sicyos angulatus.—Linné Sp. Pl., 1438. Sisters' Island, Milligan. .

**Donatia Novæ Zelandiæ.*—T. Hook. Fl. N. Zel. I., 81 t. 20. Mount Sorell, Milligan. Mount Laperouse, Oldfield. Probably overlooked elsewhere in the glacier regions.

**Panax sambucifolius.*—Sieb. in Cand. Prodr. IV., 255. Douglas River, Milligan. The Tasmanian plant is hitherto known only in leaves. It seems, however, not distinct from the S.E. Australian tree, which in foliage has proved singularly variable.

Aster ledifolius.—A. Cunn. in Cand. Pr. V., 269. Mount Sorell, Milligan.

**Cotula filifolia.*—Thumb. Fl. Cap. 696. Kent's Group, R. Brown.

**Ixiolæna supina.*—F. Muell. in Transact. Vict. Inst. I., 32. Kent's Group, R. Brown.

**Cassinia longifolia.*—R. Br. in Transact. Linn. Soc. XII., 127. Bay of Fires, W. Bissell. Not rare on the opposite Australian coast.

**Leptorrhynehus linearis.*—Les's Oyn., 273. Derwent, R. Brown.

**Calocephalus citreus.*—Les's Synops. 271. Derwent, R. Brown.

Helichrysum cinereum.—F. Muell. in Benth. Fl. Austr. III., 629. Flinder's Island, Milligan.

Helichrysum lycopodioides.—Benth. Fl. Austr. III., 634. Tops of tiers, where water stagnates, near Kelvedon, also on Prosser's River. The leaves attain a length of four lines, and are then oblong linear.

Helichrysum Backhousii.—F. Muell. in Benth. Fl. Austr. III., 633. Gravelly banks of the River Apsley. G. Story.

Helichrysum dealbatum.—Labill. Nov. Holl Plant. Spec. II., 45 to 190. Flinder's Island, Milligan.

Dampiera stricta.—R. Br. pr. 589. Bay of Fires, W. Bissell. Kelvedon, G. Story.

Scævola Hookeri.—F. Muell. in T. Hook. Fl. Tasm. I., 231, tab. 77. Swanport, G. Story.

**Scævola cuneiformis.*—Labill. Nov. Holl.Pl. Specim., I., 56, tab. 80. Swanport, G. Story. If, as Dr. Hooker suggested, the plant of Labillardére should prove a distinct South-west Australian species, then the name Scævola æmula (Br. p. 584) should be adopted for this one from Tasmania. It is identical with Brown's plant, which is dispersed from Guichen Bay to Gipps Land.

**Scævola microcarpa.*—Cavan. Icon. VI., 6 to 509. Flinder's Island, Milligan.

**Goodenia amplexans.*—F. Muell. in Transact. Phil. Inst., Vict. II., 70. On the Nile, C. St. This plant is precisely the same as the original from St. Vincent's Gulf.

**Goodenia barbata.*—R. Br. pr. 576. Tasmania, R. Brown. The writer has not seen Tasmanian specimens of this Goodenia, but as it is copiously occurring in east Gipps Land, there can be no doubt that it was found by R. Brown in the northern part of Tasmania, or on some of the adjacent islands which he visited. It is purple-flowered, though placed by R. Brown among the yellow-flowered species.

Velleya montana.—J. Hook. in Lond. Journ. of Bot. VI., 265. Swanport, G. Story.

Epacris micranthera.—F. Muell. Fragm. Phyt. Austr. VI., 72. Mount Sorell, Milligan.

Styphelia adscendens.—R. Br. pr. 536. Swanport, G. Story.

Styphelia pinifolia.—R. Br. pr. 536. Swanport, G. Story.

Trochocarpa involucrata.—F. Muell. Fragm. Phyt. Austr. VI., 57. Schouten Island, G. Story.

Richea Dracophylla.—R. Br. pr. 555. Mount Sorell. Milligan.

Mitrasacme distylis.—F. Muell. in Transact. Phil. Soc. I., 20. Kelvedon, G. Story.

Westringia angustifolia.—R. Br. pr. 501. Between Oyster Cove and Huon River. Milligan.

Westringia brevifolia.—Benth. in Cand. pr. XII., 570. Strzelecki's Peak, Flinder's Island, Milligan.

Trichinium spatulatum.—R. Br. pr. 415. Kelvedon, G. Story.

Cassytha melantha.—R. Br. pr. 404. Kelvedon, G. Story.

**Pimelea serpillifolia.*—R. Br. 360. Flinder's Island, Milligan. One of the most common of all plants along the whole shores from Spencer's Gulf to Gipps Land, likely to be found in some of the other literal tracts of Tasmania.

Pimelea sericea.—R. Br. pr. 361. Swanport, G. Story. There six feet high.

Pimelea ligustrina.—Labill, Nor. Holl. Pl. Sp. I., 9 to 3. Douglas River, G. Story.

**Hakea ulicina.*—R. Br. Suppl. 29. Flinder's Island, Milligan. Closely allied to H. dartyloides. Among the few Tasmanian Hakeæ remarkable for its leaves, always flat and three-nerved.

Lomatia tinctoria.—R. Br. pr. 389. Islands of Bass' Straits, Milligan. Not yet found on the mainland of Australia.

Dendrobium Milligani.—F. Muell. Fragm. Phyt. Austr., I., 88 to Vl. Porphyritic rocks at Bicheno, G. Story. The most southern locality of any Dendrobium.

Sarcodulus Gunnii.—F. Muell. Fragm. Phyt. Austr., I., 90. Table Cape and Macquarie Harbour, Milligan. Sea Elephant's Bay, G. Story. Also in King's Island.

Lypiranthus Burnettii.—F. Muell. Fragm. Phyt. Austr. V., 96. Macquarie Harbour, Milligan.

Lypiranthus nigricans.—R. Br. pr., 325. Rocky Cape, Milligan. The color of the flowers is saturated pure red.

**Lypiranthus suaveolens.*—R. Br. pr. 325. D'Entrecasteaux Channel, Milligan.

Caleana major.—R. Br. pr. 329. North West Bay. Milligan.

Calochilus campestris.—R. Br. pr. 320. Oyster Cove, Milligan.

Cryptostylis longifolia.—R. Br. pr. 317. Oyster Cove, Milligan.

Acianthus caudatus.—R. Br. pr. 321. Oyster Cove and Flinder's Island, Milligan.

Chætospora lepidosperma.—C. tennissima, J. Hook. Fl. Tasm. II., 81 to CXL., non Stend. Glum. II., 162. Swanport, G. Story. In habit this plant approaches to other Chætosporæ, in its hypogynous scales rather to Lepidosperma.

**Potamogeton perfoliatus.*—Linné op. pl. 182. South Esk,

C. St. As yet neither flowers nor fruits are sent from Tasmania. The plant accords in foliage, however, with European specimens and with others from Gipps Land.

**Zostira uninervis.*—Forsk. Fl. Aeg. Arab. 157. At Southport, C. St. Much smaller than Z. marina, extending northward to middle Europe. The peduncles are very slender, and the fruit is very peculiar.

**Solanum vescum.*—F. Mueller in Transact. Phil. Inst. Vict., 1., 63. King's Island, Mount Goiran. The berries are edible.

**Veronica peregrina.*—Linné Spec. Plant, p. 20.

Polycarpon tetraphyllum.—Occurs among Dr. Milligan's plants from Flinder's Island.

SOME CONTINUED OBSERVATIONS ON THE VARIABLE STAR η ARGUS, AND THE SURROUNDING NEBULA.

[Read April 14th, by FRANCIS ABBOTT, F.R.A.S., &c.]

LAID on the table a drawing of the object taken at three different periods, from 1834–7 up to February, 1868, the monographs of Sir John Herschel, taken at the Cape of Good Hope, and a record of the star from the time of Halley in 1677.

It will be remembered by some members of the society, who are interested in astronomical discoveries, that at the monthly meetings held in June, 1863, and March, 1865, some notes were read on the variable star η Argus, and the surrounding nebula. At about the same time information connected with the subject was forwarded to the Royal Astronomical Society, who published it in their proceedings. This communication led to discussions on the subject in many scientific journals, and eventually to notices in standard works on astronomy, in some of which further observations and information have been solicited. It is to answer this enquiry that the original copy of this drawing and description have been prepared. Before proceeding with the notes on the present appearance of η Argus, and its surrounding nebula, I purpose reading one or two paragraphs from recent publications in order to shew the interest which this object has excited among astronomers in Europe, from previous communications which have been sent; and it will appear clear to the present meeting by an inspection of the drawing, that fluctuations to a considerable extent have taken place since those articles were written. There is also reason to believe that other portions of the *via lactea,* as well as the nebula in question, are subject to motions by a system of acting forces calculated to produce them, and such as may offer opportunities for future observations.

DESCRIPTIVE ASTRONOMY.—Clarendon Press Series.—"The foregoing observations may be said to have relation to objects of a minor character, but we are not without at least one example of an important nebula undergoing peculiar changes. The great nebula in Argus, when observed by Sir J. Herschel in 1838, contained within its area a vacuity of considerable size. The star η, then of the 1st magnitude, was situated in the most dense part of the nebula, and was completely encompassed by nebulous matter. In 1863, we learn from Abbott, of Hobart Town, the star was entirely free from nebulosity, and only of the 6th magnitude. The observer also states that the outline of the vacuity materially different from the representation given by Herschel. Mr. E. B. Powell, of Madras, not *only confirms these remarks* generally, but also says distinctly that the *nebula as a whole has varied* much in brilliancy during the time it has been under his notice. We may evidently expect at some future time to hear of still more interesting discoveries in this department of sidereal astronomy."

THE HEAVENS, IMPERIAL OBSERVATORY, PARIS.—"We will bring this chapter to a close with a description of the most astonishing of all the phenomena of this kind,—namely, the variations of the star η Argus; a singular star, which can be classed neither among the temporary nor among the variable stars. Towards the end of the seventeenth century this star was only of the 4th magnitude; less than a century after, in 1751, it attained the 2nd. Sixty years later it again descended to its first brightness, increasing anew until the year 1826. From that epoch it has passed through the most astonishing phases, oscillating between the first and second magnitudes, sometimes equal to a Crucis, then to a Centauri, surpassing Canopus, and approaching lastly to Sirius. The rapidity of these changes, their unequal periods, the long duration of this state of variability, the impossibility of finding a law more or less regular, all contribute to make this beautiful star one of the most curious objects of the sky. Our cotemporary astronomer, Mr. F. Abbott, who has followed the variation of η Argus until now, informs us that after having, in 1843, attained the brilliancy of Sirius, it diminished progressively, passing through all the orders of intermediate magnitude between the first and sixth. In 1863 it was no longer visible to the naked eye. We are also informed that the nebulosity which surrounds η Argus, like that of Orion, does not present any symmetry in its form or in its outline. It is situated in the Milky Way, in the midst of a region so rich in stars, that more than 1,200 have been counted in the area occupied by the nebula. The stars, however, do not form part of the nebulosity, but rather appear to be simply projected on it. Towards the centre of the nebula, and close to the star η, an opening of a lengthened and rounded form is noticed, which leaves in view the dark ground of the sky. This has been named by Mr. Abbott, a careful observer, 'the Crooked Billet.' The evidences of change in this nebula are even more decided than in that of Orion. This object indeed may supply a link of the greatest importance, for we read that the objects of which it is composed (not stars) 'are now of a larger character and more refulgent than nebulous matter in general.'"

I may mention here that this object is not seen at all in Europe, at the Cape of Good Hope and Madras it is only partially seen, as in one part of its revolution it dips below the horizon. The only other object of a known similar nature in the heavens at the present time is the great nebula in Orion, which for some years past has been rigidly examined with the most powerful instruments, and discussed by the best observers with a view of investigating some apparent fluctuations. What follows will show that those changes, although now established, bear but a feeble comparison to η Argus and its nebula—the latter, however, will help to confirm what has been long suspected of the former. A paper on the nebula of Orion, read by the late Earl of Rosse before the Royal Society of London at the close of their last session, clearly shows that in the course of the last fifteen years considerable changes have taken place in that object—changes which cannot be attributed either to atmospheric difficulties of vision, or to alterations in the instruments, or in the observer's eye. If, therefore, it has taken so long a time, and been so difficult to trace the fluctuations in the nebula of Orion with the late Earl of Rosse's six feet speculum, and the fine refractor with 15 inches aparture of the late Professor Bond, how much greater and more apparent must be the alterations which are taking place in the nebula around η Argus to be discovered with a five feet refractor with only four inches clear aperture. These singular and newly-discovered motions in nebulous masses at so remote a distance, are well calculated to open up new inquiries into the physical and dynamical laws which determine the conditions and relations of the forces which produce them. The singularity of the nebulous portion of this region has but recently been made a subject of systematic examination, and but for the observations and beautiful monograph of Sir John Herschel the pecularities attached to it might have remained unknown for a long time to come. In 1677 the star η was recorded by Halley as of the 4th magnitude. Its maximum was first noted by Burchell in 1827, it being then of the 1st magnitude, and on the 30th March, 1863, it was found for the first time reduced to the 6th magnitude. Independent, however, of the variability of the star itself, there is a much more singular property belonging to the surrounding nebula, the particular features of which I now purpose to describe. The mutability of the nebula will be best made apparent by the accompanying drawing, which will at once shew the different forms of the dark space, and the relative position of η Argus to it, from 1834-7 to 1868. It must not be considered, however, that the positions and characters here given are the only ones in which the object has appeared; a system of photographs only would be the means of assisting materially the recognition of a principle of irregularity pervading the whole structure. The missing portion of the nebulous matter, as compared with the Cape Monograph, may be thought by some to be owing to the want of a larger optical power, but when the same instruments have been used throughout this objection as to variability must fail to have any weight. The principal instrument used is a 5ft. equatorial by Dallmeyer. The building being situated in a garden the view of a small portion of the circumpolar stars is intercepted by fruit trees—to make good this want a five feet portable refractor by Varley is used in the open air, so that the object has been watched and noted throughout its entire revolution round the pole. The eyepieces in general use, and found most suitable for this purpose, are a comet one of 28, and orthoscopic of 45, and an annular micrometer of about the same power. A more powerful instrument, would, no doubt, at any one observation, alter the apparent features of the nebula, and render manifest changes of a somewhat different character to those here described. To witness these effects I wait the arrival of the Melbourne telescope, when I hope to have the opportunity of more correctly verifying these statements. The investigation of the fluctuations connected with the object η Argus and surrounding nebula appears not to require such refined and delicate observations as were bestowed upon Herchel's subnebulous region near the trapezone in Orion, by the late Professor Bond, and Earl of Rosse, nor are such powerful instruments necessary. Take, for instance, the position of the star η, as given by Sir J. Herschel, at the Cape of Good Hope, and note its position again, when in the dark space as confirmed by E. P. Powell, Esq., at Madras—and now for the third time compare its situation removed from the dark space altogether to quite a different portion of the nebula, and it will appear clear that the optical means employed have been ample, notwithstanding Mr. Powell was at first inclined to think that the fluctuations were only apparent, and owing to the inferiority of his instrument. The beautiful soft white light given out by the nebulous matter about η Argus appears to be produced, either from the increased magnitude of the stars, or the displacement of some of the nebulous mass, or probably from both, for in the former case it is difficult to say (only from its position) which is η Argus and which is not, there being so great a similarity in its size and that of some of the accompanying stars. On a clear fine night the object gives out fully twice as much light as that of the great nebula—nebicula major,—and about three times as much as nebicula minor, irrespective of size. In the twilight it appears as soon as a star of the second or third magnitude the light being white and more diffused—very like a small white woolly cloud on a blue sky, seen in sunlight. It is also seen in full moonlight, when all other nebulous matter is obscured. At present there appears to be no further diminution in the magnitude of the star below the 6th. Being in Melbourne on the night of the 25th March, 1865, which was a very fine one, and happening to look towards η Argus I fancied that the star appeared as a distinct point in the nebula. I immediately proceeded to the observatory, Mr. Ellery with his accustomed kindness allowing me to take possession of the equatorial, and on examining the object found the colour of the accompanying stars to be the same as before described to the society, and, with the comparative eye-piece, considered the star η to be 5·5. It was about this time that Mr. Tebbutt, of New South Wales, forwarded the result of his observations to the society, giving the star as 5·5. This appearance, however, must be considered only transitory, for many times since that period the star has not reached more than the 6th magnitude, and may be so estimated at present. The accompanying drawing was made with an inverting eye-piece, and taken 75° east of the meridian to prevent the unpleasantness of taking it near the zenith. If, therefore, the line of sight is brought to correspond with the south of the Cape Monograph the position of both drawings will be made approximately to agree at the time they were taken. In conclusion, I would observe that the particular interest taken in this object is owing to the star's inequality of motion, as to magnitude, and fluctuations in the nebulous mass. There are on record very many variable, as well as binary stars, whose change in magnitude and periods are correctly known. If we take the star α Centauri, not far from η Argus, the binary period is 78 years, or a little more than $4\frac{1}{2}$° annually. R Leporis is Hinds' celebrated intense crimson star, max. 7, period 400 days. R Leonis is a ruby star, max. 5, min. 10, period 324 day. μ Cephei, fine deep garnet star, max. 3, min. 6, period $5\frac{1}{2}$ years, β Persei moves from max. 2 to min. 4, period 2.86727 days. α Hydrae has a period of 55 days, &c. The period that has been given to η Argus is 46 years, and its variability from 1 to 4. This we have seen, however, is not correct, since the time of Halley in 1677 we have passed over 191 years, and not arrived at either the variability or period of η Argus, and for anything known it may disappear altogether: there are stars of that class on record. In 1604 a new star appeared in the east foot of Ophiuchus, but disappeared again in 1605, it was as bright as Venus and lasted but 15 months. In 1600 Kepler discovered a new star η in Cygnus, which he observed for 19 years, it faded away and then blazed out again several times before its final disappearance in 1621. With respect to the fluctuations that are taking place in the nebulous matter, it scarcely requires to be premised, that on a subject of this nature, the highest evidence that can be attained is a degree greater or less of probability. The only speculation to unfold it, which has hitherto thrown any light upon what is so legitimate and urgent a physical inquiry, constitutes the remarkable Nebular Hypothesis of Laplace.

OBSERVATIONS ON DESMIDIACEÆ, WITH A LIST OF SPECIES FOUND IN TASMANIA.

[By E. D. Harrop.]

These beautiful plants are of an herbaceous green color, and belong to the Cryptogamic division of the vegetable kingdom. They have attracted attention not only on account of the striking beauty and variety of their forms, but also by reason of the doubt as to their position, whether in the animal or vegetable kingdom, having caused considerable discussion amongst learned algologists. They are now almost universally assigned to the vegetable kingdom. The presence of starch in the ludochrome, and their mode of conjugating, constitute incontestable proofs of their vegetable organisation, notwithstanding the arguments of Professors Ehrenberg, Dalrymple, and Bailey to the contrary.

The principal arguments in favor of their animality are passed in review by Ralfs. They are,—first, the power of voluntary motion that they possess; second, their increase by voluntary division; third, the definite organ, possessed by some genera, in which active molecules appear to enjoy an independent motion, and the parieties of which appear capable of contracting upon its contents; fourth, the swarming motion which takes place at a certain stage of their growth. Other arguments have been advanced in support of this side of the question, and Ehrenberg went so far as to describe orifices, having protruding organs or feet immediately behind them, the basis of such organs being the moving molecules which are always opened at the ends of the Closterium. Notwithstanding the great improvement in the microscope since the time of this distinguished Professor, his observations have never been corroborated, and there is little doubt but that in this instance he allowed his imagination to overrule his general accuracy.

The power of motion and increase by self-division have now been abandoned as proofs of animality. It is manifest that they can transport themselves or, perhaps are transported under the subtle influence of light, from one place to another; for if a mass of Desmidieæ be placed in a glass vase, the one side of which is exposed to the sun's rays, we shall find, after a short time, that most of them have found their way to the illuminated side of the glass. Professor Bailey also writes,—"I have had species of Closterium and Euastrum confined in a compressor, in water perfectly free from other bodies, and they moved so fast that I found it impossible to sketch their forms with the Camera Lucida until they were killed." I have also observed this fact, but the movement always seemed to me of an irregular and involuntary kind, not nearly so vigorous as that of the Diatomaceæ, which Professor Max. Schultze has shown to be caused by protoplasm coming out of and re-entering minute perforations in the shell of the Diatom.

The most extraordinary phenomenon exhibited by some of the Desmidieæ is that swarming of zoospores mentioned above. I have observed it in the genera Docidium and Cosmarium. The zoospores in the Desmid appear to be endowed with tumultuous life, and the motion can be compared only to the swarming of bees. But although this motion has been claimed as a proof of animality, it has never been observed in any undisputed animal organism, whilst it has been frequently seen in several species of Confervoid Algæ. My own observation extends to a specimen of the Draparnaldia Nana obtained from the North Esk River. I made a note of the process at the time which I will here transcribe,—" Within each cell of the plant there were several small dark vesicles interspersed throughout the endochrome. These vesicles moved about. The branches of the plant fell from their pristine erect position as if overcome by the weight of the endochrome, or, as if the cell walls might be decaying. Then the endochrome in each cell divided into two portions, within each of which were some of the dark moving vesicles above mentioned. These two divisions of endochrome rapidly assumed an oval form, and obtained a surrounding of cellulose. Presently each evinced agitation as if suddenly endowed with life, and they commenced to revolve and beat from one side to the other of the containing cell as if anxious to escape. In a minute or two more their cell burst, and they shot out twirling round and round, rushing hither and thither as if in ecstasies at their newly acquired life power. After from five to ten minutes of this display of active life they became more sober and gradually assumed a quiescent state, some resting singly, but the greater number aggregating." It is a marvellous sight. You are watching a beautiful but inert plant; suddenly its branches droop, and as suddenly the contents of each cell became endowed with impetuous, tumultuous, exuberant life.

Each frond in the Desmidieæ is a single cell, and each cell has a suture, in some species hardly recognisable, in others the constriction is so deep as to extend almost entirely across the cell, the segments being joined only by a narrow isthmus giving it the appearance of two cells instead of one. That the frond is a single cell there can be no doubt, however much appearances in some species *(vide* Micrasterias, Euastrum, *Cosmarium)* may lead one to think otherwise. The proof that *there is no septum between* the segments is readily seen, for if an opening be made in one of the segments the contents of both will escape thereout; and, moreover, we observe granules passing the whole length of the frond without impediment. A further proof lies in the conjugation of the cells and the formation of sporangia. The formation of one sporangium only at the point of contact of the two fronds does not accord with the notion of each frond having two cells.

The multiplication of cells by transverse division is full of interest, if only on account of its being the principal mode of reproduction in the protozoa. The process is exhibited as observed by me in a species of Closterium at page 4, fig. 2, of the accompanying book of illustrations. The fission takes place at the centre on the line of division of the two segments, the constriction becoming deeper and deeper until separation ensues. During the process the endochrome in each segment gradually separates and assumes the position of that in the mature plant, *vide* fig. 2, 6. On separation, the obtuse end becomes pointed, fig. 2, c., and lengthens out until complete development is attained.

It has been recorded that probably the Desmidiaceæ are truly reproduced only in two modes; the one by the escape of the granular contents immediately after the swarming process, and the other by the formation of sporangia, resulting from the conjugation of the cells. Late authorities mention four: first, cell division; second, the retraction of contents from parent cells and transformation of same into ciliated zoospores; third, division of cell contents into a number of zoospores; fourth, conjugation. My own observations on the Closterium striatolatum lead me to add another mode, viz., by the formation of a spore in each segment of the frond without conjugation, *vide* illustrations, page , figs 1, 1b. 1c. Whilst in coupling one sporanguim results from the connection of two fronds, we have here two spores in each frond. I made a large gathering of the C. Striatolatum this summer, and failed to find any of them in a state of conjugation, although it is commonly observed in this Desmid; whilst in all those sufficiently mature, I found spores as depicted in the figures, besides great numbers of them in the water free from the fronds. Fig. 1c. shows the frond ruptured and the spore ready to pass out. The ultimate history of these spores I shall endeavor to trace through the ensuing winter and spring. The universality of the Desmidieæ can be readily understood when we find their germs protected in indurated spore cases such as these. They may be wafted by the wind, or carried by various animals to any distance, when meeting with suitable conditions they burst into life. Darwin mentions fine dust clouds, which, on examination, were found to contain a large percentage of infusorial forms, falling on board the "Beagle," when several hundred miles from any land.

It is considered that those sporious bodies, called Xanthidium, found in flint are sporangia of Desmids. We have the exact fac-simile of them in the sporangia of the Cosmarium and Staurastrum. Sporangia and empty fronds have been found in tertiary deposits under the bones of extinct mammalia, which fact furnishes us with the strongest evidence of the powers of resistance to change of some of these humble and delicate organisms.

The uses of Desmidieæ are not much known. They evolve oxygen and tend to keep the water clear in which they exist. They also form food for all the entomostraca and many other animalculæ. A few months ago I lost a fine gathering of Closterium ascerosum, which I had put aside in a small bottle for the purpose of mounting, by having accidentally admitted a voracious Daphnia pulex; and I read that a recent observer saw a rotifer, the Notommata myrmeleo, seize a Closterium and suck the whole frond quite free of chlorophyll.

In giving the subjoined list of Desmidieæ I may mention that there are many species which I have not been able to recognise, especially of the genus Closterium. These apparently new species I have not ventured to name. At some future time I intend forwarding specimens and drawings to some competent algologist for identification and record.

For two or three years I have made gatherings of the Docidium verticellatum, figured at page 2. This species has not yet been found in England, although it is abundant both on the Continent of Europe and in America.

My gatherings have been made mostly from pools which are dug up during the summer. As they are plants whose favorite haunt is the open moor, and are taken in greatest numbers from perennial ponds, I have no doubt but that the Lake District and other likely places would render many rare, and perhaps new forms.

Most of the species here recorded will be found in the book of drawings. These figures are drawn under the Camera Lucida, and colored most attentively after nature.

A LIST OF TASMANIAN DESMIDIEÆ.

Closterium lunula
,, striatolatum
,, acerosum
,, rostratum
Closterium setaceum
,, Ehrenbergii
,, acutum
,, 10 species, new

Docidium verticellatum
„ baculum
„ Ehrenbergii
„ truncatum
Hegalotheca dissiliens
Desmidium Swartzii
Cosmarium margaritiferum
„ pyramidatum
Euastrum ansatum
Staurastrum muticum
„ dejectum
Staurastrum gracile
„ bifida
Penium Bribisonnii
„ truncatum (?)
Micrasterias rotata
„ 1 U.S.
Pediastrum tetras
„ simplex
„ ellipticum
Auhistrodesmus falcatus
Sphœrozosma elegans.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE AUTUMN QUARTER, 1868.

OBSERVATORY, HOBART TOWN.

Months.	Mean in Shade.		Max. and Min. in Shade		Mean Solar Intensity Black Bulb Insolated.	Mean Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure.—Barometer corrected to 32°	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Tot'l Amount collected.	
	Inches.	°	°	°	°	°	°	lbs.		In.	In.
March ..	29.881	62.12	98	40	107.79	40.26	N.W., S.E.	72.61	7	0.47	5.54
April ..	29.933	55.71	75	36	92.85	42.38	N.W., W.	82.77	9	2.09	3.06
May ...	30.130	53.14	71	34	83.89	39.69	N.W., S.W.	46.30	5	0.44	1.61
Mean..	29.931	56.99	81.3	36.6	94.84	40.77	N.W., W.	67.33	21	3.00	14.67

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Autumn quarter, 1868.

March 10.—Guthrie's Topaz Plum ripe.
,, 15.—Tips of Hornbean commencing to turn yellow.
,, 20.—Colchicum autumnale in flower.
,, 24.—Coe's Golden Drop Plum ripe.
,, 25.—Horsechesnut leaves turning brown.
,, 30.—Oak leaves commencing to fall.
April 1.—Coe's Late Red Plum commencing to ripen.
,, 10.—Chinese Chrysanthemum commencing to flower:
,, 12.—Elm leaves commencing to fall.
,, 20.—Pyrus aucuparia (Mountain Ash) leaves commencing to fall.
,, 30.—Black Mulberry leaves commencing to fall.
May 10.—First Medlar ripe.
,, 17.—Coronilla glauca commencing to flower.
,, 24.—Ailanthus glandulosa leaves all shed.
,, 25.—Diosma alba commencing to flower.
,, 30.—Photinia serrulata commencing to flower.
,, 30.—Spiræa prunifolia commencing to flower.

NOTE.—The Colchicum flowered ten days later this year than last; the Hornbean, Golden Drop Plum, Horsechesnut, Oak, Chrysanthemum, and Black Mulberry were also from seven to ten days later, but Coe's Red Plum *ripened eight days earlier.*

ROYAL SOCIETY.

JUNE, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, 9th June, J. Davies, Esq., M.H.A., in the chair.

S. Wright, Esq., and J. R. Scott, Esq., M.H.A., who had been previously nominated by the Council, were, after a ballot, declared to be duly elected as Fellows of the Society.

The Secretary, Dr. Agnew, laid on the table the usual monthly returns, viz.:—

1. Visitors to Museum, during May, 452.
2. Ditto to Gardens, ditto, 1,477.
3. Plants, &c., received at Gardens:—From Messrs. Taylor and Sangster, Melbourne, 43 plants. From T. C. Carey, Esq., 47 papers seeds of plants indigenous to Western Australia. From the Botanic Gardens, Ceylon, 42 papers of seeds.
4. Times of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table, &c., for May.
2. Port Arthur, from J. Boyd, Esq., table for April.
3. Swansea, from Dr. Story, table for April.
4. Westbury, from F. Belstead, Esq., table for May.
5. Tamar Heads, from R. Henry, Esq., table for April.

The presentations to the Museum were as follows:—

1. From W. A. B. Gellibrand, Esq. Two recent specimens of the Native Tiger. *(Thylacinus cynocephalus.)*
2. From W. Lovett, Esq. A Diamond Bird. *Pardalotus punctatus)*, and a Mountain Thrush. *(Oreocincla lunulata.)*
3. From J. W. Graves, Esq. An English Partridge. *(Perdix cinerea.)*
4. From W. H. Price, Esq., Macquarie Plains. A Gannet. *(Sula Australis.)*.

[In reference to this presentation Mr. M. Allport remarked it was a most extraordinary circumstance that a bird of this nature should have penetrated so far into the interior as the Macquarie Plains. It was evidently by its plumage a bird in its first year, and was probably easily captured, being unable readily to rise from the level of the ground on which it was found, as is the case with many long winged sea birds.]

5. From J. Forster, Esq. The skull of an Aborigine, picked up at "Brady's Look-out," Arthur's Lakes, the hunting ground of the Norfolk Plains tribe.

[This skull was found on comparison with others in the Museum, to be very similar in conformation to one obtained from the same locality some years back. In some minute particulars it differed from the Aboriginal type of skull from other parts of the colony.]

6. From J. Young, Esq. A crab caught at Kangaroo Point.
7. From Mr. F. Cotton, jun., Swanport. A lizard.
8. From J. Boyd, Esq., two Black Cockatoos, *(Calyptorynchus xanthonotus)*, shot at Port Arthur.

9. From H. Cook, Esq., Fac-Similes of the Warrants for the Execution of Mary Queen of Scots (1587), and of Charles I. (1648); also one of the "Act for establishing the Coronation Oath" (1689), and a Collection of Bulletins of the French army, 1812 and 1815.

The various items in this presentation were carefully examined by the Fellows present. Some of the bulletins, that for instance of the 16th June, 1815, and others, are of great historical interest. The warrants with the signatures attached are also well worthy of notice by the student of English History.

The Secretary then read the communication from Mr. Biggs, referred to at the previous meeting.

This was a detailed description "Of a Method of Microscopic Measurement," by means,—1st of a Camera Lucida of Mr. Bigg's own contrivance; and 2nd, of a movable scale of inches placed at such a distance that the reflected image of the object is projected upon it, and made to correspond with one or more of the divisions, the value of which has been previously ascertained by means of a stage micrometer graduated to, say—1-100 or 1-1000 inch, and applied in the same manner as described for the object.

In the absence of Mr. Biggs it was difficult to illustrate the various details given in the paper, the Society's microscope not being adapted for the particular kind of camera required. It was hoped that on a future occasion Mr. Biggs would be enabled to exhibit his method with his own instrument and appliances.

After reading the above paper, Dr. Agnew exhibited modes of minute measurement by means of English and French micrometers.

Mr. Allport brought forward a photograph of an interesting fossil ripple mark, which has been exposed in the working of a quarry at the commencement of the new Huon road, where it leaves Holbrook Place. The rocks in which it occurs belong to the carboniferous series, and the formation of this particular mark was doubtless due to the same natural causes which now affect mud-banks occasionally covered with water. The mud on which this mark was left by the receding waves must have had time to get quite hard (probably under the influence of a hot sun) before the next deposit of mud upon its surface, leaving a natural division between the two deposits, now plainly visible after the lapse of countless ages.

The usual votes of thanks having been passed, the meeting separated.

JULY, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th July, His Excellency Colonel Gore Browne, President, in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns:—

1. Visitors to Museum, during June, 374.
2. Ditto to Gardens during June, 672.
3. Plants received at Gardens:—From Mr. J. Harris, Melbourne, 36 plants. From Sydney Botanic Gardens, 36 plants. From Rev. G. Clarke, two cases of New Zealand Ferns.
4. Plants, &c., sent from Gardens:—To Messrs. Taylor and Sangster, Melbourne, one parcel of Bulbs.
5. Times of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and summary for June.
2. Port Arthur, from J. Boyd, Esq.—Table for May.
3. Westbury, from F. Belstead, Esq.—Table for June.
4. Tamar Heads, from R. Henry, Esq.—Tables for May and June.
5. Sydney, New South Wales, from G. R. Smalley, Esq., Government Observer, printed tables for March, April, and May.

Dr. Agnew read a letter from the Private Secretary enclosing a copy of a despatch received by His Excellency the Governor from the Duke of Buckingham, with a copy of "The Early Days of the Prince Consort," and one of "Leaves from the Journal of our Life in the Highlands," presented to the Society by Her Majesty the Queen.

[For these valuable presents a special letter of thanks has been sent through His Excellency, the President, for the purpose of being laid before Her Majesty.]

The presentations to the Museum were as follows:—

1. From Dr. Huston. Cap formed from husk of cocoanut, from Panama.
2. From Miss Fenton. A young Diamond Snake.
3. From Mr. E. Oldham. A halfpenny, William and Mary, and a half-farthing, George IV.
4. A Portuguese coin, 1795, from Mr. Bellette.
5. An Eagle, from Mr. Collis, of Recherche Bay, per Mr. Gould.
6. From Mr. W. Knight. A silver coin.
7. From Mr. John Buckland. Two English perch.
8. Dr. Agnew, model of a moccasin by Mr. Beamont.

After showing by the model how the moccasin was constructed, Dr. Agnew remarked he presented it as a sort of memento of the early days of the colony. At that period it was commonly used by bush travellers, and was a most comfortable covering for the feet. It was made from the thick part of the tail of the kangaroo, the hard and callous under surface of which formed the sole. Mr. Beamont could speak from long experience as to the comfort and convenience of moccasins, having on several occasions, before the existence of a road, walked in them across the island as far as Launceston, and over also to Macquarie Harbor (in 1817) where he had been sent in order to test, by examination of the bush, if it were possible that prisoners could escape thence by land.

The Secretary reported the presentation to the Society of Mr. Gerard Krefft's pamphlet on the Fauna of Tasmania, and read several extracts from it.

Mr. Allport, after complimenting Mr. Krefft on his vauable contribution to the Fauna of Tasmania, read a paper in reply to some of his observations, especially (amongst other matters) in reference to the existence of two species of Thylacine. Mr. Allport thinks the evidence is not conclusive as to the existence of more than one.

Mr. Gould agreed with Mr. Allport's remarks as to the unity of species of the so called "Bull Dog" and "Greyhound" Thylacine. As to the Eagle (presentation No. 5) he coincided with Mr. Allport in considering it a new species. He had never seen one like it till last year, when he saw several pairs at Port Davey, which appeared to differ from those with which he was already acquainted, but unfortunately he was not then able to secure one as a specimen.

Mr. Dobson noticed that the Whip Snake was said by Mr. Krefft to be innoxious, and wished to know if that was the case.

Mr. Allport said, although venomous, it was practically almost harmless, on account of the small size of the mouth. It could not possibly inflict a wound through clothes.

Dr. Agnew stated he had dissected the heads of several of these snakes, and found that the poison gland was very large for the size of the animal. He did not think it safe therefore to look upon it as tolerably harmless, as the bite on some exposed part of the body such as the finger, especially in the case of children, might be attended by serious symptoms.

Mr. Gould observed that in addition to those catalogued, there was also the so-called Green Snake in the colony.

Mr. Graves corroborated Mr. Gould's statement, and adduced two instances where this snake had come under his immediate notice.

Mr. Allport after such evidence could scarcely doubt we had a Green Snake, but he had never seen one, and would be glad to have it known that he would give five pounds for a specimen. On this subject, too, he might say he would gladly give the same amount for any of our snakes measuring six feet or upwards.

Mr. E. D. Swan, in addition to the birds enumerated by Mr Krefft, mentioned he had seen of late years in the vicinity of the domain, and elsewhere numerous specimens of the Epthianurà Albifrons.

Mr. Barnard read a paper on the Esparto or, Spanish Grass, in reference to its value for the manufacture of paper. He also gave some details as to the expense of erecting a paper mill, and alluded to the advantages to the community of the establishment of this and other manufactures.

Mr. Gould asked if calcareous soils, as stated in the paper, were absolutely necessary to the growth of the Esparto? If it grew on silicious soils, it would in all probability be a great boon to the colony, as most of our poor and waste lands were silicious, but if on the contrary it required a calcareous soil its benefit would be but limited.

Mr. Barnard replied that the *Economist* paper, the source whence he obtained his information, certainly spoke of calcareous or marly soils only.

Mr. Davies was glad to see so important a subject brought under notice, but would have been still more so had Mr. Barnard been able to lay before them more full and precise information. He had seen a very good account of the matter in *Lloyd's Newspaper* some time ago, but although desirous to refer to it on a subsequent occasion, he had been unable to do so, the paper having been mislaid. His impression, however, was that the Esparto Grass was said to grow well on poor silicious soils, and if so, it would prove to be a great boon to the colony, as said by Mr. Gould.

Colonel Crawford had also read on this subject. The grass was found on the coast of Barcelona, and he presumed therefore the soil was sandy. It was certainly poor and waste as the sailors used to go ashore and cut it without being interfered with.

Mr. Troup, D.A.C.G., said the soil along the coast of Barcelona, as in other parts of Spain, was very dry, and therefore in some degree perhaps different from that in Tasmania. Still, he knew it was very barren and useless, probably silicious and certainly not calcareous, or it would have been turned to some profitable use. He therefore thought our waste silicious lands would probably be very suitable for the Esparto.

Mr. Davies thought it was the duty of the Society to make further enquiries as to the product, the introduction of which might be of great benefit to the colony.

Mr. Gould agreed with Mr. Davies, and suggested that Mr. Barnard should be requested to obtain further information on the subject, which Mr. Barnard said he would be happy to do.

Mr. W. L. Dobson proposed a vote of thanks to Mr. Krefft for the early copy of his very interesting pamphlet, and to the gentlemen who had read such interesting papers.

Mr. Stephens seconded the motion which was carried: and the votes of thanks conveyed to the gentlemen present by His Excellency.

A vote of thanks was also accorded to the donors of presentations.

PRESENTATION TO DR. AGNEW.

His Excellency the Governor said: Gentlemen, the ordinary business of the meeting being over, I am delighted to have the opportunity of closing it in a manner as agreeable to myself, as I believe it will be to every one present. I have been requested to convey to our Honorary Secretary a small token of the approbation of the Fellows, of the services which he has generally rendered to the society, and in recognition of his constant attention and care since he first entered upon the duties of the office. (Cheers.) All that has been done, all the valuable statistics that are laid upon the table every month, can only be collected, and arranged by much labor, which occupies time, and time which is extremly valuable to a man so constantly occupied as the Hon. Secretary is in the management of his own private affairs. Before Dr. Agnew undertook the office of Secretary, I believe these duties were performed by a paid officer, but that cost the society a very considerable amount, and our funds becoming diminished, we should have been unable to go on, had not Dr. Agnew come forward and undertaken the office. He had now performed the duty of the secretaryship for a period of seven years without remuneration, and it is known to all the Fellows, with how much care, attention, and courtesy he has performed it. I believe he enjoys the esteem and regard of all the members of the Society. I have much pleasure in handing to you, Dr. Agnew, a draft for £65, on behalf of the Fellows of this society, with a request that you will purchase a piece of plate, whatever you may like best, and that you will have engraved upon it the following inscription:—"Presented by the Fellows of the Royal Society of Tasmania, to James Wilson Agnew, Esq., M.D., as a token of their regard, and a mark of their appreciation of the valuable services rendered by him as Honorary Secretary of the Society. July, 1868.

His Excellency handed the cheque to Dr. Agnew amid cheers.

Dr. Agnew said: Your Excellency and Fellows of the Royal Society,—Even had I been more used than I am to speak in public I could scarcely have trusted myself to do so on such an occasion, and therefore hope you will excuse me if I read the few words which I have to say. The compliment which has just been conferred upon me is so great and so unexpected that I need not attempt to express the feelings, partly of pride, partly of misgiving which it has excited. To have gained the goodwill or approbation of a large and intellectual portion of his fellow citizens must be to anyone an unceasing source of satisfaction, and I can therefore truly say that nothing in public life has ever given me higher pleasure and gratification than your presentation of this splendid testimonial. I feel painfully, however, that my actual services have fallen far short of the value you have kindly put upon them, and, although I have at all times endeavoured to do what I could to promote the best interests of this society, and to keep up friendly relations with scientific bodies of a similar character in various parts of the world, I seem to have done so little, that I am conscious I owe the present compliment more to your kindness, than to any desert of mine. But if I have not been able to do as much as I could have desired, it has never, I think, been from want of will, and unless unforseen circumstances arise to render it impossible, I shall still feel great pleasure in acting as heretofore, until, at least, the services of some more efficient volunteer may be secured. I now beg to return my warmest thanks to all those who have interested themselves in the present movement. With the sum now placed at my disposal I shall, agreeably to your request, procure some article of value, on which I shall feel great pride in having engraved the inscription you have provided; and, I need scarcely add, in future years I shall rarely look upon it without being reminded of the present meeting, and of many a pleasant hour devoted to the service of the Royal Society of Tasmania.

The proceedings then terminated.

AUGUST, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th August, His Excellency Colonel T. Gore Browne, President, in the chair.

Mr. C. T. Belstead, who had been previously nominated by the Council, was after a ballot declared to be duly elected a Fellow of the Society.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz.:—

1. Visitors to Museum, 487.
2. Ditto to Gardens, 266.
3. Plants, &c., received at Gardens:—From Mr. J. Harris, Melbourne, 43 plants and 19 scions of fruit trees. From R. Henderson, Sydney, 16 plants.
4. Plants sent from Gardens:—To Mr. T. C. Wren, 55 plants and 76 species bulbs.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and summary for July.
2. Port Arthur, from J. Boyd, Esq.—Tables for May and June.
3. Swansea, from Dr. Story.—Tables for May and June.
4. Westbury, from F. Belstead, Esq.—Table for July.

The presentations were as follow:—

1. From Mr. J. Dennett, Campbell-street, one silver coin (½ Dime), United States, America; one twopenny piece, George III.; two copper coins; a small medal, apparently struck in commemoration of the Battle of Albuera; also an Esquimaux dress from Behring's Straits.
2. From Mr. W. Young, Clarence, Plains, a grebe *(Podiceps poliocephalus.)*
3. From Mr. G. W. Linley, Oatlands, a chestnut-faced owl *(Strix castanops.)*
4. From Mr. M. Allport, a young Opossum from the pouch.
5. From Dr. Crowther, two Fish from Lady Elliott's Island.

The Secretary directed the attention of the meeting to the following books lately received as donations to the library.

1. From W. H. Archer, Esq., Registrar-General, by direction of the Government of Victoria, Notes of Progress of Victoria, 1835—1860, (parts 1 and 2), 1861-2-3-4-5-6 and 7, Statistical Register of Victoria and Calendar for 1855 (2 copies) Statistics of Victoria, 1867, Part 1st, Population; Part 2nd, Accumulation. Statistical tables, compiled for Dublin Exhibition, 2 sheets.
2. From Government of New Zealand, Statistics of New Zealand for 1866; Abstract of Principal Results of Census of New Zealand, 1867.
3. From Colonel Sir H. James, R.E., by direction of the Right Hon. the Secretary of State for War; Comparison of Standards of Length of England, France, Belgium, Prussia, Russia, India and Australia.
4. Reports and proceedings of Royal Society, London Linnean Society, Geological Society, Geographical Society, Asiatic Society, &c., &c.
5. From Dr. Milligan, Artisans' Report of Paris Exhibition of 1867. The Technologist Nos. 4 and 5 for 1866; Nos. 6 to 12 for 1867, &c., &c.,

The Secretary read a letter from Mr. Calder, the Surveyor-General, relative to the destruction of the Mutton Birds *(Puffinus brevicaudus)*, and their eggs on the islands in Bass' Straits, and suggesting that steps should be taken with a view of protecting them, at least during the breeding season.

Mr. M. Allport fully agreed with the statements in Mr. Calder's paper as to the ultimate effect of the wanton destruction now going on, both of the birds themselves and their eggs, and he hoped that some practical effort would be made for their proteetion.

Mr. Wright suggested that some controlling power by the agency of the police should be exerted.

Mr. Gould made some observations on the paper referring to a visit made by him to the "rookeries" at Port Davey, pointing out as interesting the habit of a small Petrel occupying to some extent the same burrows as the Mutton Birds, prior to their arrival, from which, however, they are at once expelled by the latter; and while agreeing in the object of the author, stated that some difficulties would arise in the adoption of steps to prevent the destruction of the Mutton Birds from the fact of the subsistence of the islanders in the Straits being dependent to a considerable extent upon the harvest of young birds procured by them. They were not contented, however, with this, but also destroyed the old birds and eggs, and preservation ought therefore to be provided.

The Bishop thought it would be well if the islanders themselves could be induced to take an intelligent interest in the preservation of a bird which was of vital importance to them.

Discussion ensued, in which Colonel Crawford, Mr. Barnard, and others took part. It was suggested that the law now in force to protect native game during the breeding season, might be made applicable to these birds. Finally, it was proposed by Mr. Barnard, seconded by Mr. Justin Browne, and carried, "That the suggestion contained in the paper should be remitted to Government, in order that action, if possible, might be taken in the matter."

Mr. F. Abbott read an interesting paper on "Spectrum Analysis, and its application to Science." The subject was subsequently illustrated by the exhibition of spectra from flames, in which various metals (Sodium, Potassium, Strontium, &c.,) were burned. The lines characteristic of each metal were well shown, and were examined with much interest by the Fellows present.

A vote of thanks to the authors of the papers, and donors of presentations having been accorded, the meeting separated.

REMARKS ON MR. KREFFT'S "NOTES ON THE FAUNA OF TASMANIA."*

By Morton Allport, F.L.S., F.Z.S.

No one can deny that advantage is to be derived from scientific statistics concerning our natural history, especially from such pamphlets as that presented to the Society by Mr. Krefft, and our cordial thanks are due to that gentleman for his courtesy in so soon forwarding us a copy.

It was not to be expected that, with the limited collection before him, Mr. Krefft could make anything like an exhaustive list of our Fauna, therefore, as the Council of this Society will probably republish Mr. Krefft's notes in the Transactions, the value of those notes may be enhanced by calling attention to those parts to which additions ought to be made, and to some conclusions arrived at by the author which, in my opinion, are likely to prove erroneous.

In Placentalia, Mr. Krefft places first on the list *Canis dingo*, the Dingo, and adds "now extinct." What evidence has the author of its former existence in Tasmania? I never heard of one having been seen in this colony, or of the bones of one ever having been found; of course this is no proof that the Dingo never existed here, but I consider the presence of the *Thylacinus* and *Sarcophilus* (Tiger and Devil) as very strong presumptive evidence that the Dingo never did exist here, even without the negative evidence above mentioned. If the Dingo had been absent in Victoria and New South Wales, my conviction is that the Tiger and Devil would still be keeping down the excessive increase of Kangaroos and other herbivorous marsupials, instead of their bones only being found in the tertiary deposits of those colonies; in other words the Dingo being of a higher type and greater intelligence would, if present here, have rapidly driven out the marsupial carnivora, and we in Tasmania should have had to search our bone caves or other tertiary deposits (as they now have to do in the neighboring colonies) for proof of their former existence.

Referring to No. 8 on the list, *Mus Tasmaniensis* (Kr.), this may be the species common on Mt. Wellington, and which I have regarded as identical with *Mus fuscipes* (the dusky-footed rat) figured in part 3 of Gould's Mammals of Australia. In addition to this species two other small rodents are known, both from Port Davey, the skins of which were brought to me by Mr. Charles Gould. They are distinct from the Mt. Wellington species, and may belong to either the genus *Mus* or *Hapalotis*. Mr. Gould also mentions having seen, at Macquarie Harbour, a third species with unusually large eyes; this will also probably prove to be a new *Hapalotis*.

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*See Appendix.

In the list of Phalangers, Mr. Krefft has added *Phalangista Vulpina*, thus making separate species of our black and grey Opossums, though Mr. John Gould in his Mammals of Australia points out (as I think correctly) that the grey is only a variety of the black *(P. Fuliginosa.)* The black and grey breed indiscriminately and specimens may be obtained of all shades of colour from one to the other.

The beautiful little flying opossum *(Belideus Sciureus)* must now be added to this list, as it has been long acclimatised on the northern side of the island and is frequently met with.

Amongst the *Dasyure* family I scarcely think the evidence sufficient to warrant the division of the genus *Thylacinus* into two species. In the copy of his pamphlet which Mr. Krefft kindly sent me, and which I have now the honor to lay before the Society, he has included photographs of the skulls of *Thylacinus cynocephalus* and *breviceps* (so-called) but, while I admit that remarkable differences exist in these two specimens, I shall not be at all surprised if a large series of skulls should exhibit degrees of transition from one to the other and thus prove *T. breviceps* to be a variety rather than a species, and in connection with this subject I would remark that abnormal forms are constantly found in the marsupial skeleton.

Years ago I frequently heard of the short-nosed or bull-dog tiger, but could only get very contradictory accounts from the various settlers and shepherds who spoke of them. I have examined over 50 specimens in all, many of them carefully, and though I have found some variation in the shape of the skull, that variation has never been sufficient to divide the species, and, I am bound to say, no such marked difference as that exhibited in Mr. Krefft's specimens ever fell under my notice. To show how little reliance can (in a question of this sort) be placed in the statements of men who are not naturalists, I would call your attention to the two specimens of *Thylacinus Cynocephalus* from our Museum, now before you, a male and female. Some time back, a visitor from the Upper Derwent volunteered the information to our Curator, Mr. Roblin, that the larger specimen was a greyhound tiger, and the smaller (the female) a bull-dog tiger; the head is somewhat shorter and broader in the female specimen, and hence his conclusion. A strong argument against Mr. Krefft's short *headed specimen being* more than a variety is, I think, to be found in the fact that no distinct locality has ever been assigned by the settlers or shepherds for the habitat of the so-called bull-dog tigers, and very few, if any, of the same persons attempt to deny that the greyhound and bull-dog tigers mate together. If the one form were found in the dense scrubs of the north coast, and the other amongst the bleak ranges of the Upper Derwent, I could understand that a specific distinction really might exist, but no one pretends that this is the case, both are said to occur in all localities inhabited by the *Thylacinus*, and I would here draw attention to a fact so general that it may be looked upon as a law of nature, viz., that one tract of country is seldom, if ever, inhabited by very closely allied species of *Carnivora*, though varieties mating together may be common, and the reason probably is, that their habits and food being identical, such closely allied species would be perpetually in collision, and the weakest would inevitably be driven to a separate district.

In order to finally settle the question of one or two species, I am now endeavoring to obtain specimens of the so-called bull-dog tigers, and shall be glad of the assistance of Fellows of the Society residing in the country. To the Dasyure family another Antechinus (*A. leucopus*) is to be added.

Amongst the birds, to the order Raptores and family Falconidæ must now be added another eagle, killed at Recherche, and just added to the Museum, which does not quite answer to the description of any of those figured in Gould's *Birds of Australia*. It approaches more nearly to the Whistling Eagle (*Haliastur sphenurus*) than to any other, but is evidently distinct.

In Gould's recently published *Handbook to the Birds of Australia* the author has separated the New Holland Goshawk from the genus Astur, and placed it in the genus Leucospiza. The Grey Goshawk (*Leuscospiza Raii*) has never to my knowledge been seen in Tasmania, whereas the White Goshawk, now erected into a new species under the name *Leuscospiza Novæ Hollandiæ*, is very common. The latter name should, therefore, be substituted in Mr. Krefft's list for *Astur Novæ Hollandiæ*.

My friend, Mr. Edward Swan, our best authority on Tasmanian ornithology, has pointed out to me an omission in the order Insessores, viz., the white-fronted Ephthianura (*Ephthianura albifrons*). Mr. J. Gould in his handbook says it does not inhabit Tasmania, but Mr. Swan has seen it in several localities during the last three years, and at the present time it abounds at Cornelian Bay.

To the family *Cuculidæ* of the same order the Channel Bill

(*Scythrops Novæ Hollandiæ*) should be added as a specimen is a now in the Museum which was recently shot at Clarence Plains.

The sombre Swamp Quail (*Synoicus sordidus*) of which we possess one specimen shot in Tasmania must be added to the order *Rasores*, family *Perdicidæ*.

In the order *Grallatores*, family *Ardeidæ*, the Australian Egret (*Herodias Alba*) and the Nankeen Night Heron (*Nycticorax Caledonicus*) have been omitted, both birds are frequently found in Tasmania. The Land Rail (*Rallus pectoralis*) must also be added as it is constantly met with.

To the family *Anatidæ* of the order *Natatores* must be added the Maned Goose (*Chlamydochen jubata*) many pairs of which made their appearance on the upper part of the Derwent during the summer of 1866 and 1867.

As to fresh water fish, Mr. Krefft has asked me to furnish him with any forms besides those mentioned in his list, with which I am acquainted, and this I shall have great pleasure in doing during the coming summer and will place the list of names obtained from him before the Society.

I know of ten well marked indigenous species in addition to the four mentioned by Mr. Krefft; of these ten two belong to the *Genus Galaxias*, one to the Perches, and two to the Lampreys, but of the affinities of the remainder I am ignorant.

Although Mr. Krefft will not yet give us credit for the Salmon, he may assuredly add to his list the Trout (*Salmo fario*) the Tench (*Tinca Vulgaris*) and the Perch (*Perca fluviatilis*) all of which now abound in various localities.

Of the invertebrates to the class *Insecta* and order *Lepidoptera* a large number of species will have to be added as our moths are numerous, many of the forms being limited to small localities.

ON THE ACCLIMATISATION OF ESPARTO GRASS FOR THE MANUFACTURE OF PAPER, AND THE ESTABLISHMENT OF A PAPER MILL IN TASMANIA. BY J. BARNARD.

A casual inquiry from a friend led me to search the files of a periodical, *Public Opinion*, for some account of Esparto grass, extracted from *The Economist;* and I was fortunate enough to meet with the following information on the subject, published in January, 1866, and which I thought might not be unacceptable to the Members of the Royal Society.

The important position which the lately discovered article of petroleum has rapidly taken in commerce is very interesting in itself, as suggesting how quickly the discovery of any new principle of motion would exercise an important influence on the present state of our industry. Another discovery has lately been made, which, though of less importance than that of petroleum, is still so interesting in character, and so useful as regards an important article of manufacture, as to be deserving of attention from those desirous of witnessing the introduction into Tasmania of a new industry.

The discovery alluded to is the applicability of the *Atocha*, or, as it is called in Spain, "*Esparto*," to the manufacture of paper. Mr. Lloyd, of the Walthamstow Paper Mills, is stated to have had a great share in the merit of this discovery; and Mr. Mark, the British Consul at Malaga, has drawn up an interesting report on the subject, which has lately been made public in the commercial reports.

This grass is the produce of waste lands: it requires no expense in cultivation, and little in collecting. It is best propagated from the roots, and not from seed. It is perennial, and propagates of itself, and improves by a regular yearly gathering if plucked with sufficient care. Mr. Mark has devoted great care in his endeavours to ascertain the climate and soil which are favorable to the development of the plant; and it appears that the Atocha requires a decidedly hot and dry climate,—that it grows equally well in the plains and in the mountains to a moderate elevation,—and that as regards soil it flourishes both in calcareous and argillaceous soils, or when these soils are blended in the form of marl.

The greatest quantity is shipped from the provinces of Almeria and Murcia; but it is found, though in less abundance, in all the southern provinces of Spain.* It is also said to be plentiful in some parts of the opposite coast of Africa, and shipments were made from Oran to England.

Prior to the discovery of its being available for the manufacture of paper, the Esparto has been used in Spain as fuel, in the manufacture of ropes for mining and rigging, and for making baskets and matting. But the discovery of the valuable properties of the grass has made a complete revolution in the districts where it grows. Fortunes have been realised by individuals who were the proprietors of the land which produce it. The price has more than doubled, and is now estimated by Mr. Mark at £4 2s. per English ton on board. The greater part of the exports have as yet been directed to England, where in the brief space of three or four years the article has become a requisite of the highest importance, 160,000 tons having been, as it is said, imported into England in that period; and Mr. Mark estimates the present rate of annual export at 50,000 tons.

Mr. Mark estimates that, even at its present enhanced price, the Spanish grass will take a place with cotton, hemp, and wool as one of the staple and essential bases of manufacturing industry: and if this anticipation should be realised, in addition to the valuable resource which it seems likely to prove to our paper manufacturers, it will form an important element in trade between England and Spain; indeed, our shipowners have already largely profited by a discovery which has enabled them to find freights for their vessels employed in conveying coals and machinery to the mining districts in Spain, and which had hitherto, in the majority of cases, been under the necessity of returning to England in ballast.

From the *Quarterly Review* for April, 1868, are derived the following important particulars of this useful article. In 1852 a patent was taken out for Esparto as a substance for the manufacture of paper by Jean Antoin Farina, and again in 1854 and 1856 by James Murdoch and Thomas Routledge. Specimens of paper made from its fibre had previously been seen in the Algerine section of French products in the Exhibition of 1851. The *Ahkbar*, daily paper, has been printed in Algiers for years upon it; and it was introduced to the whole world in the "Exposition" of 1867, the catalogue of which is printed upon paper made from Esparto alone. The grass known to botanists by the name Stipa, or Machrochloa tenacissima, grows wild upon both sides of the Mediterranean for about five degrees of longitude. It comes on the European side from the east coast of Spain, principally from Carthagena, Almeria, Aquelas, &c., where it has long been used for making mats, ropes, soles of sandals, and the Iberian scourges of Horace (Epod. iv.); and it appears that any quantity of it may be obtained from Algeria, where it is a most abundant weed. It is white, and very tenacious in fibre; and, after rags, it is pronounced to be the best material yet discovered for the making of paper. The favour in which it is held by the British paper-maker may be gathered from the fact that between 65,000 and 70,000 tons of Esparto grass were imported into England for paper-making purposes in the year 1866.

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* Seeing that there is a difference of several degrees of latitude between the provinces of Spain where this grass flourishes and the colony of Tasmania, I confess that I am not sanguine as to whether this grass could be successfully acclimatised here; but, as its geographical range may be wider than supposed, a trial might at all events be made in certain localities most favorable for the experiment. Should it fail, it might doubtless prove a success in the adjoining colonies of Australasia.

This closes the information derived from the *Economist* and the *Quarterly Review*,—and here I should leave the subject were I not desirous of associating with it some remarks on the additional facilities likely to be afforded by the cultivation of this grass for the establishment of a paper mill.

At the present time, when there exists an earnest desire to do something to ameliorate the condition of the forlorn children who throng our streets, the introduction of a new local industry, affording means of employment, must be fraught with great public advantage whether regarded in a social, moral, or economical point of view.

When in England, in 1862, I visited several of the principal paper mills, for the purpose of gathering information as to the best processes of manufacture that might possibly prove useful in the event of this industry becoming established in Tasmania. I had in view the existence here of certain auxiliary means and appliances for this important object; viz., the great extent of water-power available along our creeks and rivers; the vocation given to the neglected and destitute in our population for the collection of rags and old clothes lying useless and worthless in almost every domicile,—and which would hence acquire, however small, a certain commercial value; the utilising the labour to be found in our penal, charitable, and kindred institutions in sorting and washing and preparing the rags for the mill. I assume that the resort to labour of this description should stop here, and that the actual manufacture of paper should be taken up at this point and be carried on in a separate and independent establishment, whether by the Government as a really reproductive work, employing the necessitous receiving eleemosynary relief from the State, who would thus be made to contribute to their own support, or by the agency of a public company influenced in its formation by adequate material encouragement, it is foreign to this paper now to discuss. One thing is clear that, at the present moment, were a paper mill to be worked altogether by coerced labour, independently of its skilled management and direction, the scheme would be free from the objection that has hitherto attached to the products of penal establishments, of their clashing and coming into competition with the fruits of free and unfettered industry.

Acting upon these views, I procured from an eminent engineering firm in London a design for a paper mill upon the most modern and improved construction, drawn to a scale of feet, with specifications, and reliable estimate as to its cost.

This mill would be capable of turning out 10 tons per week, working daytime only, or 20 tons working day and night as in England. The number of hands that it would employ—men, women, and children—would be about 120 in all, producing 20 tons of paper a week; or say 80 persons only, should 10 tons weekly suffice for the present demand, in addition to a general superintendent or manager, and such other staff as may be found necessary for the commercial part of the business.

A constant and unfailing supply of pure water is absolutely essential to the enterprise. If sufficient water-power can be obtained at a convenient site, considering transport, &c., it is undoubtedly the cheapest prime motive power.

The undertaking would require a capital of £25,000 to defray the entire cost of the necessary buildings and plant, all of the most complete and improved descriptions, full particulars of which I could detail if required.

I fear that I have prolonged this paper beyond reasonable limits, and will, therefore, to avoid further prolixity, simply add that the drawing of the works, with specifications and general statement, will, with pleasure, be placed by me at the service of any persons disposed to engage in this branch of industry.

Reverting, in conclusion, to the Esparto grass, some seeds might be procured from Europe, possibly through the British Consul in Spain, or even through the Secretary of States, upon the intervention of the President; and it would be in harmony, I conceive, with the scope of the Royal Society's functions to take the initiative for adding to the resources of the colony.

[Mr. Barnard has written to London for seeds, samples of the pulp, and specimen sheets of the Esparto paper. On arrival they will be laid before the Society.]

SPECTRUM ANALYSIS AND ITS APPLICATION TO SCIENCE.

By Francis Abbott, F.R.S.

At the monthly meeting in March, 1863, I brought before the Members of the Society some notes relative to the researches and early investigations into the phenomena and history of prismatic analysis.

At that time the researches of Professor Kirchoff, and Bunsen's appliances for the examination of colored flames, were but little known. Spectroscopes were scarce, and had not been introduced into the colony, consequently the only way of illustrating the paper was by means of colored drawings and some scientific apparatus. Many important discoveries have, however, been made since that period, especially from the results of Spectrum Analysis applied to the heavenly bodies, some of which will be rendered more apparent by the few following preparatory notes on the subject:—

It is well known that the laws of radiant light and heat are not only very similar but that these phenomena themselves are in all probability due to the same physical cause. "This analogy," says Balfour Stewart, "between light and heat as regards reflection, refraction, absorption, and probably polarization, will tend to show that radiant light and heat are only variations of the same physical agent, and also that when the spectrum of a luminous object has been obtained the separation of the different rays from each other is physicaly complete." In any region, therefore, of the visible spectrum the illuminating and heating effects are caused by precisely the same rays. If, for instance, we take the region of the spectrum near the violet, or most refrangible extremity, we find that luminous and chemical effects are produced, and in both cases the same rays are the active agents.

The solar spectrum has the property of being intersected by a series of dark lines, which are of great service in showing that there is only one active agent at one part of the spectrum, for towards the left extremity, or the red end of the spectrum, there is at the same time a heating and illuminating effect. These different rays possess distinctly heating, luminous, and chemical properties; there is, however, a great difference between the first of these and the two latter, " for the heating effect of a ray may be made the physical measure of the power which this portion of the spectrum possesses."

When light which has emanated from different sources is decomposed by a prism, the spectra which are obtained may differ in several important respects from each other, but all of them can be conveniently arranged in three general groups.

The special character which distinguishes spectra of the *first order* is that the continuity of the colored band is unbroken either by dark or bright lines. We learn from such a spectrum that the light has been emitted by an opaque body, and most probably by matter in a solid or liquid state. A spectrum of this order gives no knowledge of the chemical nature of the incandescent body from which the light comes.

Spectra of the *second order* are very different. These consist of colored lines of light, separated from each other. From such a spectrum we learn that the luminous matter from which the light has come is in the state of *gas*. Every compound body that can become luminous in the gaseous state without suffering decomposition is distinguished by a group of lines peculiar to itself. Substances *when in the state of gas* may be distinguished from each other by their spectra, providing the lines characteristic of the different terrestrial substances are known. The discoveries effected by Mr. Huggins have shewn that many of the Nebulæ are of gaseous composition, presenting the spectrum of bright lines separated by dark spaces.

The *third order* consists of the spectra of incandescent solid or liquid bodies, in which the continuity of the colored light is broken by dark lines. These dark spaces are not produced by the source of the light; they are produced by vapours through which the light has passed on its way, and which have robbed the light by absorption of certain definite colors, or rates of vibration; such spectra are formed by the Sun and Stars.

The spectra obtained from the Moon and Planets are unlike those produced by the Stars and Nebulæ, these latter not being original sources of light, but shining by reflection only; their spectra resemble, therefore, a modification of the solar spectrum.

*Circumstances fre*quently unite in rendering investigations of this nature very difficult. On but few of those nights when the stars shine brilliantly is the air sufficiently steady for such very delicate observations. The light of the Stars is also very feeble, and requires a large instrument with an object glass of not less than eight inches aperture to gather up and concentrate to a focus the light from so small an object.

Another inconvenience arises from the apparent motion of the Stars caused by the rotation of the Earth. This difficulty has been overcome by the application of clock work, by which the telescope and observer are moved in a direction opposite to that of the Earth, by which means the object is kept within the focus of the instrument. In practice, however, it is found not easy to retain the image of a Star steady for any length of time exactly within a slit, the jaws of which are only 1-300th of an inch apart.

These difficulties being overcome, the light produced by a terrestrial substance is compared with the Stellar Spectrum by means of a prism fixed over one half of the slit, which receives the light reflected into it by a movable mirror that faces a clamp of ebonite, provided with forceps to hold the fragments of metals employed. These metals are rendered luminous in the state of gas, by the intense heat of sparks produced from a powerful induction coil. The light from these sparks is reflected into the instrument by means of the mirror, and a small prism being placed in connection with the larger one, which receives the light from the Star, the two spectra are visible in juxtaposition, by means of a small telescope; and thus the coincidence and relative position of the bright lines in the spectrum of the Star can be accurately determined by the bright lines in the metallic spectrum.

The spectroscope, as an instrument of research applied to scientific discovery, had never a more fitting subject to operate upon than that for the investigation of which the "Rigid Spectroscope" was contrived by J. P. Gassiot, V.P.R.S., and manufactured by Mr. Browning.

It is customary to speak of light, heat, electricity, &c., as "imponderable agents," or as gravity, a property manifested under certain conditions, Mr. Balfour Stewart, and Professor Tait, of Edinburgh, in technical language employed by the former, state: "That to this time it has been assumed, without proof, that the change in the co-efficient of terrestrial gravity does not in itself alter any other co-efficient of a body, and if a reason be asked none can be given, since gravity is a force of nature, of which men of science are confessedly ignorant." Now, if gravitation acts upon light so as to have a share in determining the position of any rays emerging from a prism, and forming a spectrum, a considerable change in the position of such a prism and of such light rays, involving a change in the force of gravitation, might cause a dark line in the spectrum to take a new position, more or less differing from that which it first assumed. The construction of this "Rigid Spectroscope," therefore, was to ascertain whether the position of the well-defined lines of a spectrum is constant, while the co-efficient of terrestrial gravity under which the observations are taken is made to vary.

The difficulties of making such a Spectroscope were very great, but they have been overcome, and a series of trials in Mr. Browning's workshop at Kew, and in the apartments of the Royal Society, have shewn that the variation of the D line is quite infinitesimal, in spite of great changes of temperature, and the removal of the instrument from place to place.[*]

Great interest has of late years been attached to the composition of Meteors, shooting Stars, and Bolides, to learn something of which, Mr. Alexander Herschel has constructed a direct-vision Spectroscope, fitted up with peculiar prisms for binocular arrangement, having a wide field of view and great power. This instrument, like the former, presented considerable difficulties of optical construction, which have been overcome by Mr. Browning.

Observers furnished with a Binocular Spectroscope may direct it like an opera-glass to that portion of the sky where the Meteors are expected to fall vertically towards the Earth, near (but not too near) the radiant point, where their course is foreshortened, and their apparent motion comparatively slow. As Meteors and shooting Stars make lines of light in the sky, each will give one or more lines of light in the Spectroscope. If, for example, we had a *Sodium* Meteor, it would give a *yellow* line in the sky, and a yellow line occupying the place of the Sodium line in the Spectroscope. If *Silver* were present, together with Sodium, the Meteor train would have a greenish tinge, and three lines would appear in the Spectroscope; viz., *yellow*, *green*, and *blue*. The spectral examination of the August Meteors has brought to light the fact of the existence of an extraordinary quantity of the vapour of Sodium in their composition.

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[*] Since these remarks were made on the Rigid Spectroscope, it has come to my knowledge that the instrument has been put on board of H.M. Ship Nassau, in charge of Captain Mayne, who was preparing to make a survey of the Straits of Magellan. A lengthy correspondence with some results has been received by J. P. Gassiot, Esqr., from Captain Mayne, which was placed in the hands of Pro. Stokes, and Mr. B. Stewart, from which it appears that the result at present influencing the variation of gravity does not exceed in passing from Lat. 45° to the Equator, a change of refraction for the yellow of the spectrum equal to about three-fourths of the interval of the D-lines, but more observations are required on the ship's return before it can be asserted that this apparent change is not due to known causes.

One point of importance to be ascertained by means of the "Meteor Spectroscope" is whether shooting Stars and their luminous trains, are composed of porous or of solid matter, and from Spectrum Analysis of the August Meteors the probability is that their composition is a mineral substance in which sodium is one of the principal ingredients.

From the study of mineral matter in a state of incandescent vapour, Spectrum Analysis has become of the greatest importance. Much is also learnt by observations on the light transmitted by or reflected from solutions of colored substances, however small the proportion in which they may be present, and in this way the Spectroscope has been very successfully applied to the Microscope. In examining the solutions prepared for this part of the subject there will be seen on the stage of the Microscope what have been named Fraunhofer's dark lines, which have been made by Professor Kirchoff the key by which this kind of writing can be deciphered and read.

When a ray of light falls upon a glass prism two different actions take place; first the ray is refracted or bent out of its course, secondly, it is opened or spread out like a fan. This last action is called dispersion; the dispersion of any part of the spectrum is proportional to the angular interval between two rays of nearly equal refrangibility; both these actions depend on the substance employed in the formation of the prism. The size and character of a Spectroscope, the quality and number of prisms required, with such refracting angles as will produce the greatest dispersion with the least loss of light, should be regulated by the work required of it.

For the detection of metals, the spaces, and bands by which their presence is indicated, are conspicuously shown by an instrument that will display the chief lines of the Solar Spectrum, but there are many thousand lines discernible with more powerful apparatus, and many lines that appear single under ordinary circumstances,are foundto be double ormultiple when examined by superior means.

As a means of research, the application of Spectrum Analysis to the Microscope has not yet been attended with results of so decided a character as the study of mineral matter in a state of incandescence, although by such application we can detect and measure very minute quantities, and also compare the spectra of two solutions together.

It is much more difficult to learn what is and what is not characteristic in objects prepared for examination in this kind of analysis. For example, the exact position of the dark absorption bands in the spectrum obtained from blood is of an important character; it requires but little dispersion, and it is necessary to use the Micrometer for measurements, as well as suitable tests for proof. A solution of *Cudbear* in dilute alcohol yields two very faint bands in much the same place as those of fresh blood, but on adding ammonia one band becomes very dark and distinct, and the lower band disappears altogether. The addition of ammonia to a solution of fresh blood produces no such changes. If ammonia is added to a solution of cochineal, two absorption bands are produced in much the same position as those of fresh blood, and without care they might be confounded.

There are many objects like the foregoing which require careful and proper appliances; there are also many others of a much more characteristic kind. A striking spectrum is produced by a very dilute solution of *Permanganate* of *Potash*, which gives five well marked absorptions bands at about equal intervals in the green, and one or more in the blues. *Aniline Red*, *Madder*, coloured crystals, and many other substances, make easy and suitable objects for the Microscope, if the solutions are not made too strong, so as to destroy the delicate absorption bands. Sometimes these absorption bands are broad and indistinct, but in other cases narrow and well defined, and they are then much more characteristic.

The best known object for testing fine definition is a pale blue solution of Chloride of Cobalt in a concentrated solution of Chloride of Calcium. If the two lines are seen in the orange the definition must be very satisfactory.

To show the effects produced by means of Spectrum Analysis under the Microscope I have prepared very weak solutions of the following substances, viz.:—Permanganate of Potash, Aneline Red, Madder, and Cochineal; also fresh blood largely diluted. It must, however, be understood that a casual exhibition of these spectra is one thing and a scientific enquiry is another, for every part of the spectrum differs from the adjacent parts in refrangibility, and delicate bands can only be brought out by accurately focussing their own parts. It is, therefore, necessary to close the shutters in the Spectroscopes over the slit on the remainder of the object, by means of the two levers provided for the purpose, leaving only that portion of the spectrum visible which is under examination.

It will therefore appear clear that time will not admit of entering into these details, as the object intended this evening was more to explain and illustrate the principle adopted for ascertaining the characteristic spectra produced from the *luminous vapours* given off by the combustion of the following metallic substances. It will be remembered, however, that some of the coloured lines produced by these metallic vapours, although very characteristic and decided, are but of short duration.

1st. *Sodium.*—The spectrum-reaction of *Sodium* produces only one yellow line which is coincident with Fraunhofer's dark solar line D, for if the *soda* and the *solar* spectra were to fall one over the other the *yellow soda* line would exactly cover the dark solar line D. This is important, as it enables us to draw the conclusion respecting the presence of soda in the *Sun's* atmosphere.

2nd. *Lithium.*—The spectrum produced by this metal is very beautiful and quite characteristic. It consists of one intensely brilliant crimson line, and one less distinct orange line.

3rd. *Chlorate* of *Potassium.*—All compounds of this substance give a widely extended continuous spectrum, which contains only two characteristic lines, one in the outermost red, approaching the ultra-red rays, which coincides with the dark line A. of the *Solar* Spectrum, and a second line situated at the extreme end of the violet rays.

4th. *Nitrate* of *Strontia.*—The spectrum produced by *Strontia* is especially characterized by the absence of green bands. There are eight lines in this spectrum which are remarkable, namely, six red, one orange, and one blue. These *Strontia* bands are important both as regards their position and intensity.

5th. *Chloride of Barium.*—The spectrum of the compounds of *Barium* is the most complicated of the spectra of the alkalis. It is at once distinguished from all the others by two green lines, which are by far the most distinct, appearing the first, and continuing during the whole of the reaction.

6th. *Chloride of Calcium.*—This substance becomes gas at the temperature of flame, and gives a characteristic spectrum, which is distinguished from the foregoing spectra by a very bright green line and one intensely bright orange line, lying very near the red end of the spectrum.

There are other substances I propose to submit if time allows, viz., the metal *Thalium*, which produces the beautiful intense green *Thalium* line, very near the solar line D; Sulphur, which is various; and a mixture of the foregoing substances, which gives the characteristic lines of each in the spectrum.

In conclusion, it may be asked what new knowledge have we gained by prismatic analysis? We have seen that the Stars contain material elements and have a structure analagous to that of the Sun, also that their colours originate in the chemical constitution of the atmosphere surrounding them. The variable Star in Corona appears to show that great physical changes are in operation.* That the material of Comets is similar to the matter of the Gaseous Nebulæ, and may be identical. That Meteors, Bolides, and shooting Stars are of mineral composition. That our investigations of the universe are undergoing important changes, and that we require to wait patiently for more facts from the obvious teachings presented to us by new observations, doubting not that for wise purposes the Great Creator superintends the whole.

* Mr. Huggins and Dr. Miller, in analysing this Star, found its light to form a spectrum unlike any other celestial body that has been examined. It is compound, and emanates from two different sources, each light forming its own spectrum, one of which, in the instrument, appears to be superposed over the other. One of these is formed by 4 bright lines. The other is analagous to the spectra of the Sun and Stars. It is known by the position of the bright lines in the spectrum that one of these luminous gases is *hydrogen*, and this taken in connexion with other circumstances together with the sudden outburst of the Star, has suggested the probability of the Star becoming suddenly enwrapt in a flame of burning *hydrogen*. This Star is No. 2,765 of Argelander's Zone, + 26°, and at the time of Argelander's sweep it was below the 9th magnitude.

2. Mr. Baxendell has supplied the following table of magnitudes :—

1868.	May 15,	at 12h. 0m.	G. M. T.,	T. Coronæ	=	3.6 or 3.7	magnitude.
	,, 16	,, 10h. 30m.	,,	,,	=	4.2	,,
	,, 17	,, 11h. 0m.	,,	,,	=	4.9	,,
	,, 18	,, 12h. 30m.	,,	,,	=	5.3	,,
	,, 19	,, 12h. 15m.	,,	,,	=	5.7	,,
	,, 20	,, 12h. 13m.	,,	,,	=	6.2	,,
	,, 21	,, 12h. 0m.	,,	,,	=	7.3	,,
	,, 22	,, 11h. 15m.	,,	,,	=	7.7	,,
	,, 23	,, 10h. 30m.	,,	,,	=	7.9	,,
	,, 24	,, 10h. 30m.	,,	,,	=	8.1	,,

3. If we take in the objects from the Chinese Catalogue of Ma-Tuan-Lin, there are recorded about 20 of these remarkable Stars during the last two thousand years.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE WINTER QUARTER, 1868.

Observatory, Hobart Town.

Months.	Mean in Shade.		Max. and Min. in Shade		Mean Solar Intensity Black Bulb Insolated.	Mean Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure. — Barometer corrected to 32°	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Total Amount collected.	
	Inches.	°	°	°	°	°	°	lbs.		In.	In.
June ..	29·943	47·12	31	31	74·70	35·77	N., W.	08·06	12	1·01	0·89
July ..	29·985	47·30	30	36	78·21	33·63	N.W., S.W.	41·61	16	3·76	1·59
Aug. ...	29·906	50·06	32	34	87·27	35·32	N.W.	17·68	8	0·33	1·45
Mean..	29·944	48·16	31	36·6	80·06	34·57	N.W.	33·11	36	5·10	3·93

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Winter quarter, of 1868.

June 10.—Maclaura aurantiaca leaves shedding.
,, 18.—Privet leaves shedding.
,, 30.—Black Mulberry leaves all shed.
,, 30.—Pyrus japonica commencing to flower.
July 10.—Arbutus unedo commencing to flower.
,, 14.—Garrya elliptica commencing to flower.
,, 16.—White Mulberry buds commencing to break.
,, 17.—Almond commencing to flower.
,, 30.—Crocus commencing to flower.
,, 31.—White Hyacinth commencing to flower.
Aug. 12.—Sambucus niger buds commencing to break.
,, 15.—Horsechestnut buds commencing to break.
,, 20.—Gooseberry buds commencing to break.
,, 26.—Elm *(Ulmus campestris)* commencing to flower.
,, 28.—Poplar *(Populus dilatata)* commencing to flower.
,, 30.—Apricot in full flower.

Note.—The early Narcissus and Snow-flake were at least a month later this year than last. The Privet was 5, Arbutus unedo 7, Garrya elliptica 8, W. Mulberry 6, Sambucus niger 10, Gooseberry 10, Elm 12, and Poplar 7 days later.

FRANCIS ABBOTT.

ROYAL SOCIETY.

SEPTEMBER, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 15th September. The Hon. R. Officer, Esq., Vice-President in the chair.

The Secretary (Dr. Agnew) laid on the table the following returns for the past month :—

1. Visitors to Museum, 514.
2. Ditto to Gardens, 1,574.
3. Plants, &c., received at Gardens :—From Mr. W. Knight, jun., a collection of seeds gathered in New Zealand. From A. Verschaffelt, Ghent, Belgium, 391 papers, Seeds of trees, shrubs, herbaceous plants, &c.; 21 collections of florists' flowers, comprising 320 varieties.
4. Plants, &c., sent from Gardens :—For decoration of grounds of Asylum, New Norfolk, 82 Plants. To Mr. R. Henderson, Sydney, 23 Plants; 8 varieties cuttings.
5. Tench supplied to Acclimatisation Society, Nelson, New Zealand, 7.
6. Time of leafing, &c., of a few standard plants in Gardens.
7. Books, &c., received.
8. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for August.
2. Swansea, from Dr. Story, table for July.
3. Westbury, from F. Belstead, Esq., table for August.
4. Tamar Heads, from R. Henry, Esq., table for August.
5. Swan Island, Goose Island, King's Island, Kent's Group, South Bruni, and Mount Nelson, monthly tables for the half-year ended 30th June, from the Marine Board.

The Secretary read a letter, from which the following is an extract, forwarded by Mr. Boyd, of Port Arthur, giving a detailed description by one of the overseers (Mr. F. A. Keith) of the remarkable tidal disturbance at Long Bay, of the 15th August, which, as is well known, occurred on the same day along the shores of all the Australian colonies and New Zealand :—"At 9 a.m., at low water, a huge wave was seen entering the Bay from the open sea, at the rate (as estimated) of about 11 or 12 miles per hour. The force was such that logs of heavy blue gum timber, which for years had been embedded in the sand, were washed ashore. A launch at anchor in the Bay, was driven for a distance of 100 yards, dragging her anchor and chain cable. A length of about 50 yards of a substantially built wooden jetty was swept away, and the rush of the water was so rapid that several men at work on the jetty only saved their lives by leaping into a launch which they had been engaged in loading. The water having thus risen to the height of *seven* feet, receded as rapidly to the extent of *ten* feet, the rise and fall together having occupied only fifteen minutes. During the day many waves of a similar character rolled into the Bay, the last, which occurred at a late hour, being even greater than the one described, but as its rise and fall were much more slow and gradual, the effects were not so remarkable."

The presentations to the Museum were as follow :—

1. From Mrs. Downing, Battery Point, a Scorpion, with 20 young ones ; two specimens of Squid.
2. From Mr. Young, Bellerive, a Crab, and a specimen of Hippocampus sp.
3. From J. A. Moore, jun., Esq., New Norfolk, a Coot *(Fulica Australis.)*
4. From Mr. Williams, Sandy Bay, Egg cases of Sting Ray.
5. From Dr. Officer, a Platypus *(Ornithorynchus anatinus)*.
6. From F. G. Waterhouse, Esq., Curator, South Australian Institute Museum, Adelaide, 91 specimens (55 species) South Australian and other Birds.

This valuable presentation was received as a very liberal exchange for specimens sent to Adelaide from this Museum.

7. From Mrs. C. Meredith, 50 specimens (30 varieties) of Algæ, &c., from Prosser's Bay.

The Secretary directed special attention to the many beautiful forms of these algæ and corallines. A hope was expressed by some of the Fellows that Mrs. Meredith would still continue her labors and add to the value of her gift by future contributions of a similar kind to the Museum.

8. From Mr. William Norris, Franklin, Huon, Nest of an insect taken from the middle of the limb of a tree. The limb was two feet in diameter, and grew about 200 feet from the ground. An insect resembling a Wire-worm was found in the nest.

In reference to this nest Mr. M. Allport observed that the insect which produced it probably belonged to the family of hymenopterous insects, known as wood-boring wasps, as a somewhat similar, though smaller, structure made by one of the same family was common in decaying stumps in many parts of the colony. The nest has evidently been deserted some time, and the wire-like worm, mentioned by Mr. Norris, was probably an interloper. Though the delicate fabric has the appearance of being carved out of the solid wood it is really built of a sort of paper, composed of the woody fibres, worked into a paste by the insect. If a few more colonists would but imitate the good example of Mr. Norris, much interesting information as to our indigenous animals would soon be collected.

The Secretary directed the special attention of the Fellows to the splendid skeleton of the Black Fish (Gen. *Orca)* which had just been set up, and was so creditable to the skill, and practised manipulation of the curator, Mr. Roblin.

Mr. W. Knight, junr., read a paper on a specimen of chrome iron ore from the West Coast of the island. This was carefully analysed by Mr. Knight, who exhibited to the meeting the various compounds he had obtained from the ore, *i.e.*, bichromate of potash, chromic acid, chromate of lead, chromate of potash, sesquioxide of chromium, and hydrated ditto.

In the discussions which ensued no precise information was elicited as to the quantity of the ore which could be obtained.

Mr. Knight, at the request of the meeting, promised to procure further information as to the commercial value of the ore, and the facilities, if any, for obtaining it in quantities for exportation.

In proposing the usual vote of thanks, with special reference to Mr. Knight for his paper, and to Mr. Waterhouse of Adelaide, the mover, (Mr. M. Allport) fully concurred in the remarks previously made by Dr. Agnew, as to the credit due to Mr. Roblin for the preparation of the very fine skeleton of the Black Fish now before them.

The vote having been carried unanimously, and the chairman having *specially thanked* Mr. Knight, the meeting terminated.

OCTOBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th October, His Excellency Col. T. Gore Browne, C.B., President, in the chair.

Dr. Agnew laid on the table the usual returns for the past month, viz.:—

1. Visitors to Musem, 589.
2. Ditto to Gardens, 1861.
3. Plants received at Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Gardens.
5. Presentations to the Museum, &c.

Also Meteorological returns from Hobart Town, Port Arthur, Swansea, Westbury, Tamar Heads, Adelaide, and Sydney.

The following presentations to the Museum were brought under notice:—

1. From H. M. Hull, Esq. A Whip Snake and two Lizards.
2. From H. L. Roberts, Esq. A War Dress made from cocoanut fibre.
3. From the Colonial Secretary. Specimen of Arfvedsonite from Swan Island, with report of assay.
4. From Mr. W. F. Pettard, junr. Twenty-one varieties Tasmanian Shells.
5. From Mr. Degraves. A Fossil from Sandstone.
6. From Mr. J. Young, Kangaroo Point. A Shark.
7. From Mr. Calvert. A small collection of Shells from King's Island.
8. From Mr. W. Legrand. Specimen of paper manufactured in Java from the inner bark of a tree.
9. From J. Boyd, Esq., Port Arthur. Skull and part of Skeleton of a small Whale, cleaned.
10. From J. Buckland, Esq. A fine specimen of the Argonaut *(Argonauta tuberculosa)* from Kent's Group.

There being no papers read, a conversational discussion took place, and after the usual vote of thanks to the donors of presentations, the meeting broke up.

NOVEMBER, 1868.

The monthly evening meeting of the Fellows was held on Tuesday, the 10th November, H. Bilton, Esq., in the chair.

The Secretary laid on the table the usual returns for the past month, viz.:—

1. Visitors to Museum, 517.
2. Ditto to Gardens, 1,859.
3. Times of leafing, flowering, and fruiting, of a few standard plants in Gardens.
4. Plants received at Gardens:—From Mr. T. C. Wren, Auckland, New Zealand, two large plants *(Cyathea medullaris and C. dealbata)*. From Mr. J. Simmonds, Launceston, 8 papers Seeds from Japan.
5. Seeds supplied from Gardens:—To Melbourne Botanic Gardens, seeds of *Chamærops excelsa* and *Pinus insignes*.
6. Tench supplied—To J. W. Graves, Esq., 17; to be forwarded to Auckland, New Zealand.
7. Books and Periodicals received.
8. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table for October, with summary.
2. Swansea, from Dr. Story, table for September.
3. Westbury, from F. Belstead, Esq., table for October.

The Presentations to the Museum and Library were as follows:—

1. From W. A. B. Gellibrand, Esq., Ouse River, a Snake.

With regard to this snake, Mr. Gellibrand, who considers it a new species, stated when presenting it to the Museum, that he had long known of its existence, and that it always inhabited the tea tree scrubs, close to the river, but from its habit of immediately taking to the water when disturbed, it was very difficult to kill.

The snake has since been ascertained to be a young specimen of the Black Snake of the colony *(Hoplocephalus Curtus)*.

2. From Mr. W. McDowell, Long Bay, two Centipedes from West Indies.
3. From Mr. R. Clarke, ship "Derwent Hunter," eye of a Whale, dried.
4. From Mr. O. Flexmore, a Lizard, 13 pebbles, and a Bank Note of United States.
5. From H. M. Hull, Esq., a Snake, two Iguanas, and specimens of Fungi from a Myrtle Tree *(Fagus Cunninghamii)*.
6. From Mr. Wintle, nest of a hymenopterous Insect, allied to the Mason Wasps.
7. From Mr. Harburgh, a Hermit Crab.
8. From J. Tebbutt, jun., Esq., Meteorological Observations made at the Peninsula, New South Wales, in the years 1863, 1864, 1865, 1866, bound.
9. From Mr. Hainsworth, a collection of Fossils from Table Cape.
10. From H. Bilton, Esq., a recent specimen of the Koala, or Native Bear *(Phascolarctos cinereus)*.

This was probably one of several of the same kind, which were introduced into this colony a few years ago from Victoria, where they are indigenous. The specimen now presented was killed on Mr. Bilton's property (about eight miles from the place where it was set free), by one of the labourers who found it sitting in the early morning on the top of a gate post. It is evidently full grown and well-nourished.

The Secretary read a paper by Mr. M. Allport, "On the Reasons for introducing the Perch into Tasmania."

Conversations having taken place, the usual vote of thanks was (on the motion of Mr. Gould, seconded by Mr. Swan) accorded to the author of the paper and the donors of presentations, and the meeting terminated.

REASONS FOR THE INTRODUCTION OF THE PERCH INTO TASMANIA.

By Morton Allport, F.L.S., F.Z.S.

As many persons in this and other Australian colonies appear to consider that the perch introduced into the colony will prove injurious to other and better fish, it may be well to place upon record the reasons for such introduction.

The rivers of Tasmania are divided into two very distinct classes, namely, those which are ever flowing, and take their rise in mountain streams or large lakes, and those which only run during the winter months, and in summer consist (like many Australian rivers) of a series of deep still pools. The first class are admirably adapted for the rock and rapid loving salmonidæ, while the second form a suitable home for comparatively still water fish, such as perch, carp, and tench.

The differences in these two classes of rivers are well marked by their indigenous inhabitants, the lively grayling *(Prototroctes murœna)*, closely approaching the salmonidæ in character, being present in the first class and absent in the second. The Derwent, South Esk, and Huon, and many of their tributaries, are good examples of the one class—the Macquarie, the Jordan, and the Coal River, of the other. No sensible man would compare salmon or trout with perch, but while there are in Tasmania hundreds of miles of rivers, and acres of lagoons and backwaters devoid of good indigenous fish, which will not produce salmon and trout, and will produce perch, surely the latter fish ought not to be altogether excluded.

Whenever they become numerous the perch will doubtless find their way to the rivers which produce better fish, but it must be remembered that in any given river the localities suitable for trout and salmon in the early stages of their growth are by no means those frequented by perch, and if the perch should occasionally swallow a few hundreds of young salmon or trout, the old salmon and their congeners will never forget to return the compliment on a far larger number of perch which produce young in such numbers as to supply a vast quantity of valuable food, and it is an undoubted fact that the salmon and trout do more injury both to spawn and fry of their own species than the perch.

In numberless rivers, salmon, trout and perch, are all indigenous, and each would be plentiful if fairly treated by *their worst enemy*, man.

As a mere question of sport, the introduction of perch will be regarded as a boon by a large number of people, for while comparatively few will like to incur the expense of salmon fishing or undergo the labour required to attain proficiency in trout fishing, numbers will follow a sport like perch fishing, which yields much recreation at little cost. So keenly is this felt by many English fishermen that while strenuous efforts are being made to increase the number of trout in the Thames, and to re-establish the salmon there, large sums of money are expended in affording protection to the perch and other white fish.

But beyond all this one strong reason for the introduction of perch is to be found in the fact that for purposes of artificial rearing, no food is so easily grown for the young salmon and trout in their earliest stages as the minute perch fry, each of the latter being not one twentieth the size of their devourers when those devourers first begin to feed.

At Huningue and Stormontfield the young fish are fed with boiled liver, pounded fine, but however carefully used, a quantity of this liver escapes the fish, and gets lodged in the gravel, where it decomposes and soon becomes a fertile source of disease and death. Even the young larvæ of the common blow fly, hitherto used at the Plenty, though somewhat better than liver, are apt to escape the fish and die, doing more or less damage to the water, but if a stream from a pond in which perch are hatching by millions is led through the water containing young salmon or trout, all the perch fry which are not immediately bolted, roam quietly about, doing no harm to the water, till their inevitable turn comes.

A lot of young trout hatched from the egg and fed in this manner during the winter of 1867 were turned out at four months old with a loss of only 6 per cent.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SPRING QUARTER, 1868.

OBSERVATORY, HOBART TOWN.

Months.	Mean in Shade.		Max. and Min. in Shade		Mean Solar Intensity Black Bulb Insolated.	Mean Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure.—Barometer corrected to 32°.	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Total Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
Sept. ..	29·864	55·17	66	35	97·57	42·08	N.W., S.E.	40·36	12	2·71	2·48
Oct. ..	29·799	56·81	89	39	101·35	43·23	N.W., W.	97·80	10	1·83	4.94
Nov. ...	29·889	61·73	84	43	110·67	47·47	N.W., S.E.	75·16	5	0·16	5·77
Mean..	29·850	57·90	79·6	39.0	103·19	44·26	N.W. S.E.	71·10	27	4·70	13·19

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Spring Quarter of 1868.

Sept. 8.—Ash commencing to flower.
,, 16.—Oak commencing to break into leaf.
,, 18.—Vines ditto ditto.
,, 19.—First Moutan Peony flower open.
,, 25.—Horse Chesnut commencing to flower.
,, 30.—Robinia Pseudo Acacia ditto ditto
Oct. 5.—Carpinus betulus commencing to leaf.
,, 12.—Ailanthus glandulosa ditto ditto.
,, 16.—Common lime ditto ditto.
,, 18.—Morus niger ditto ditto.
,, 22.—Ulmus campestris seeds beginning to fall.
,, 26.—Melia azederach commencing to leaf.
Nov. 1.—First ripe strawberry (British Queen) gathered.
,, 4.—Ditto cherry ditto.
,, 7.—Black mulberry in full flower.
,, 14.—Pomegranate commencing to flower.
,, 21.—First ripe raspberry (Red Antwerp) gathered.

The majority of the above plants were about seven days earlier this season than in 1867. Strawberries were 24 days, and cherries 21 days earlier.

FRANCIS ABBOTT.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SUMMER QUARTER, 1868-9.

OBSERVATORY, HOBART TOWN.

Months.	Mean in Shade.		Max. and Min. in Shade		Mean Solar Intensity Black Bulb Insolated.	Mean Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure.—Barometer corrected to 32°.	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Total Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
Dec. ..	29·739	61·55	84	40	107·23	47·74	N.W., S.E.	78·83	12	1·47	5·80
Jan. ..	29·747	62·40	74	43	106·45	48·92	N.W., S.E.	37·44	13	4·31	4·80
Feb. ...	29·877	62·52	88	44	103·34	50·32	N.W., S.E.	45·25	9	0·81	4·37
Mean..	29·787	62·16	82	42	102·34	48·99	N.W. S.E.	53·84	34	6·59	14·97

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Summer Quarter 1868-9.

December 4th—First bunch Red Currants ripe
,, 5th—Common Privet commencing to flower
,, 8th—First bunch Black Currants ripe
,, 12th—Melia azederach commencing to flower.
,, 14th—Doyenne d'Ete Pear commencing to ripen.
,, 15th—Yellow juneating Apple ditto
,, 20th—Striped Margaret Apple ditto
,, 22nd—First Apricot (Royal) ripe
January 1st—Ditto (Roman) gathered
,, 6th—Grevillea robusta in full flower
,, 10th—First Jargonelle Pear gathered
,, 15th—Veronica augustifolia in full flower
,, 15th- Mulberries commencing to ripen
February 5th—Kerry Pippin Apple ditto
,, 6th—Windsor Pear ditto
,, 8th—Bon Chretien Pearditto
,, 18th—Common Ash commencing to shed seed
,, 22nd—Common Sycamore ditto.

NOTE.—The Red Currant was 11 days, Black Currant 10 days, Melia azederach 16 days, Doyenne d'Ete Pear 16 days, Juneating Apple 16 days, Apricot 16 days, Jargonelle Pear 12 days, Kerry Pippin apple 9 days, Windsor Pear 8 days, Bon Chretien Pear 12 days, and Ash 11 days earlier this year than last. The remainder were all a few days earlier.

FRANCIS ABBOTT.

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA,

FOR THE YEAR

1868.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.

1868.

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Kermode, Hon. R. Q.	**Mona Vale**
Knight, W., jun.	**Sandy Bay**

Langdon, Captain the Hon. W., R.N., M.L.C.	Montacute
Lewis, David, M.H.A.	Hobart Town
Lord, Simeon	„
Lowes, Hon. T. Y., M.L.C.	Glenorchy
Lord, James	Hobart Town
Lloyd, E. M., Lieut. R.E.	„
Maclanachan, James	Ballochmyle
MacNaughtan, Alexander	Hobart Town
Mather, J. B.	„
Maxwell, C. M.	„
†Milligan, Joseph, F.L.S.	England
Moore, J. A.	New Norfolk
Meredith, Hon. C., M.H.A.	Hobart Town
Morrison, Askin	„
Marsh, H. J.	„
McLean, Rev. R.	„
Mace, J. C.	Clarence Plains
Napier, G. R.	Hobart Town
Officer, Hon. Robert, M.H.A., Speaker	New Norfolk
Pillinger, J.	Antill Ponds
Peters, H. J.	Hobart Town
Robertson, William	Melbourne
Rooke, A. F.	Deloraine
Rout, William	Hobart Town
Roberts, H. L.	„
Salier, G., M.H.A.	„
Sharland, W.S., M.H.A.	New Norfolk
Solomon, Joseph	Hobart Town
Stephens, T., M.A., Inspector of Schools	„
Stewart, Alexander	Launceston
Story, J. F.	Swanport
Storie, Rev. J.	Hobart Town
Susman, L.	„
Stone, W.	„
Swan, E. D.	„
Scott, J., M.H.A.	Launceston
Scott, J. R., M.H.A.	New Town
Tonkin, H. B.	Hobart Town
Turnley, G. W.	Launceston
Troup, J. J., D.A.C.G.	Hobart Town

Walch, James	**Hobart Town**
Waterhouse, R. S.	**,,**
Weaver, G.	**,,**
Weston, W. P.	**Norfolk Plains**
Whitcomb, G.	**Hobart Town**
Whyte, Hon. James, M.L.C,	**,,**
Wilson, George, jun.	**Mount Seymour**
Wilson, Hon. J.M., M.L.C.	**Hobart Town**
Wise, F. H.	**,,**
Woolley, J.	**,,**
Wilkins, A.	**England**
Webster, A. G.	**Hobart Town**
Wright, Stephen P. H.	**,,**
Young, Russell	**,,**

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 28th January, 1869 : T. Giblin, Esq., in the chair.

THE Chairman having read the advertisement by which the meeting had been convened, called upon the Secretary to read the Report.

Before reading the Report, the Secretary informed the meeting that His Excellency the Governor had accepted the office of President of the Society, and had appointed the same gentlemen Vice-Presidents as last year, viz. :—The Hon. R. Officer, M.H.A. ; the Hon. T. D. Chapman, M.H.A. ; J. W. Agnew, M.D. ; and the Ven. Archdeacon Davies, B.A.

The Report for 1868 was then read.

It was moved by Mr. BILTON, seconded by Mr. NAPIER, and carried, "That the Report be adopted and printed for circulation amongst the Fellows."

The metting next proceeded to the election, by ballot, of four members of Council in place of those retiring by rotation, Messrs. H. Bilton and Justin McC. Browne being appointed scrutineers.

The following gentlemen were re-elected :—

The HON. R. OFFICER
H. J. BUCKLAND, ESQ.
T. STEPHENS, ESQ.
J. BARNARD, ESQ.

Messrs. H. Cook and F. Butler were elected Auditors of Annual Accounts.

Mr. Morton ALLPORT moved "that the thanks of the Meeting be accorded to the Honorary

Secretary Dr. Agnew, for the manner in which he had conducted the business of the Society during the year."

Mr. H. Bilton seconded the motion, which was carried with acclamation.

Dr. Agnew thanked the meeting for the compliment paid him, referring to the deep interest which he felt in the progress of the Society. He alluded to the very handsome pecuniary testimonial with which they had presented him a short time back, and said he had intended to have visited Melbourne during the summer, and to have purchased with it some lasting memorial of their kindness, as he had been requested to do. Circumstances had, however, prevented him from leaving Hobart Town up to this time, but he hoped he would shortly be able to go accross the straits, when he would take care to procure a suitable testimonial.

Mr. Buckland moved "that the thanks of the meeting be given to the chairman for presiding on that occasion."

Mr. Barnard seconded the motion, which was carried.

Mr. Giblin said he was very sorry to have to return his thanks to them for the compliment now paid him. He thought that one or other of the vice-presidents should have been present to take the chair, especially upon such an occasion. However, he thanked them for the vote accorded to him.

The proceedings then terminated.

REPORT.

The Session of 1868 was opened on the 24th March, by a paper from Dr. (now Baron) F. Von Müeller, Ph.D., F.L.S., &c., on the Phytography of Tasmania, which deserves especial notice for its intrinsic value, and from the fact that it was the only one received from our corresponding members. The following papers were also read at the monthly meetings :—"Some continued observations on the variable Star η Argus and the surrounding Nebulæ," by F. Abbott, Esq., F.R.A.S.; "Observations on Desmidiaceæ, with list of species found in Tasmania," by E. D. Harrop, Esq.; "Remarks on Mr. Krefft's notes on the Fauna of Tasmania," by Mr. Allport, Esq., F.L.S., F.Z.S.; "On the cultivation of Esparto Grass for the manufacture of paper and the establishment of a paper mill in Tasmania," by J. Barnard, Esq.; "Spectrum Analysis and its application to Science," by F. Abbott, Esq., F.R.A.S.; "On a specimen of chrome iron ore from the West Coast of Tasmania, with an analysis," by W. Knight, jun., Esq.; "Reasons for introducing the Perch into Tasmania," by M. Allport, Esq., F.L.S., F.Z.S.

The Microscopical Soirée, which was held in April, was as much appreciated as usual by the numerous visitors who were present.

The Meteorological Abstracts of the Observations furnished from the various stations in and round the island, for the last two years, are in course of compilation, and will, we expect, be published before the close of the current half year.

Our papers and proceedings for the past Session have been forwarded to various scientific societies and individuals in England, America, the neighbouring Colonies and elsewhere.

COUNCIL.

No vacancy has occurred during the year. The required list according to rule XXXII., as amended at the last Annual General Meeting, has been exhibited in the Library for the last fortnight.

FINANCE.

It is with extreme regret that the Council have to request the special attention of the Fellows to the course taken last year in reference to the grant-in-aid. This has been so inimical to the interests of the Society that it would appear to have been partly done through inadvertence, as no saving to the revenue of the colony was effected by it.

Since the year 1853 the Museum has always received from Government £200 per annum. But now, when the expenses have greatly increased, through the steadily increasing number of specimens, and when we consequently feel the greatest difficulty in keeping within our income, an entire quarter of the grant has been withdrawn and added to the amount voted for the gardens.

Our total income (viz., Government grant £150 to Museum, £450 to gardens, subscriptions £123, and sale of plants £86 1s. 7d.) has been £809 1s. 7d., which with £30 12s. 0d. in the hands of the Superintendent of the Gardens for payment of current expenses, £19 10s. 0d., arrears of subscriptions received since 31st December, and about

£30 still due, will give a total of £889 3s. 7d. The total expenditure and liabilities amount to £953 2s. 8d. leaving to our debit a balance of £63 19s. 1d.

As to the liabilities referred to, it may be mentioned that they are mainly due to a claim of £59 5s. 2d. from Messrs. Orger and Meryon, of London, on an account due some years ago, but which had been lost sight of from the fact of that firm having retired from business. A part of the claim has been paid off during the year.

GARDENS.

Three hundred new plants have been added to our collection during the year, several of which are of great interest; on the other hand, it is to be regretted that owing to the unusually protracted drought, and an insufficient supply of water, many have died during the last few months. All the annuals have suffered severely, very few of the spring-sown having germinated, and such as did so, were dried up before flowering.

The beautiful white water lily *(Nymphæa alba)* has become established in the reservoir, where it has produced upwards of a dozen of its pretty blossoms during the season. *Nuphar lutea* also flourishes in the same situation, and will, doubtless, blossom next season.

During the past year two acres of ground, a portion of which is intended for the extension of the Pinetum, have been trenched, and many new and interesting pines are ready for planting as soon as the ground is sufficiently prepared for their reception.

The approximate number of visitors during the year was 20,624. As, however, the bye-law requiring visitors to sign their names has been relaxed, the entrance door is now left open, and so many persons enter unobserved, that the actual number probably exceeds that given.

MUSEUM.

Considerable progress has been made in labelling and arranging the various collections during the year. Mr. Gould has presented several additional specimens procured during the geological survey of the Island, and has also devoted considerable time to the general arrangement of the Geological Department.

The whole of the Tasmanian birds, &c., have been removed from the general Museum, and re-arranged in the large room upstairs, which had been fitted up for the purpose as mentioned in last report. This room will be entirely devoted to the exhibition of Tasmanian specimens, and the arrangement will, it is hoped, be completed during the year. Skeletons of many indigenous animals have been prepared, and are now ready for articulating. A large skeleton of the blackfish (Orca sp.) has been prepared, articulated and mounted by the Curator, Mr. Roblin, and is a great acquisition to the Museum.

A few additions have been made to the Conchological collection, for which we are indebted to the liberality of Mr. Legrand.

Exchanges have been made with the Museum of the South Australian Institute (Adelaide), and further transactions of a similar character, advantageous to both Societies, will no doubt be continued.

The number of visitors has been 6836.

STATEMENT of the Funds of the ROYAL SOCIETY for the Year 1868.

RECEIPTS.

	£	s.	d.	£	s.	d.
Annual Subscriptions from 76 Members	114	0	0			
Arrears of ditto	9	0	0			
Total Royal Society				123	0	0
Museum—Grant in aid from Treasury	150	0	0			
Total Museum				150	0	0
Botanic Gardens—Proceeds of Sale of Plants, Fruit, &c.	86	1	7			
Grant in aid from Treasury	450	0	0			
Total Botanic Gardens				536	1	7
Balance overdrawn at Commercial Bank				85	6	3
				£894	7	10

	£	s.	d.	£	s.	d.
Note.—Dr.—To overdrawn Balance at Bank	85	6	3			
Amount due to Messrs. Orger and Meryon ..	44	5	2			
Ditto Wheatley & Co., to 30th June, 1868	14	9	8			
				144	1	1
Cr.—By Cash in hands of Mr. Abbott, for payment of Wages	30	12	0			
Subscriptions, arrears of, since received	19	10	0			
Ditto due	30	0	0			
				80	2	0
Balance to Debit				£63	19	1

EXPENDITURE.

	£	s.	d.	£	s.	d.
Balance overdrawn at Commercial Bank, as per statement for 1867				40	11	3
Interest on overdrawn Account, 1868				5	19	11
Royal Society—Meteorological Instruments	4	9	0			
Printing and Advertising	28	19	0			
Postage, Parcels, &c.	2	15	6			
Collector's Commission, 5 per cent. on £123	6	3	0			
Messenger for delivery of Papers to Members	1	0	0			
Expenses of Illumination in honor of Visit of Prince Alfred	1	12	6			
Library—Books and Stationery	55	2	5			
Total Royal Society				100	1	5
Museum—Curator's Salary	125	0	0			
Attendant's Wages	52	0	0			
Insurance	6	7	6			
Purchase of, and preparing Specimens	7	1	6			
Water Rate	3	3	0			
Fuel and Light	3	7	5			
Sundries and Petty Cash	0	15	6			
Camphor, Spirits of Wine, &c.	7	8	7			
Freight and Carriage of Specimens	1	1	6			
Fittings, Repairs, &c.	11	7	11			
Ironmongery	4	1	2			
Total Museum				221	14	1
Botanic Gardens—Salary of Superintendent	150	0	0			
Wages of Foreman, Labourers, &c.	304	6	0			
Tools and Repairs of ditto	22	17	9			
Freight and Carriage of Plants	5	10	6			
Stationery and Postage	2	8	4			
Forage	3	19	5			
Ironmongery	8	15	2			
Flower Pots	10	8	0			
Sundries	15	7	0			
Seeds	2	9	0			
				526	1	2
				£894	7	10

Audited and found correct, January 28th, 1869,
FRANCIS BUTLER, } *Auditors.*
HENRY COOK,

BOOKS PURCHASED & PRESENTED DURING 1868.

[*Books presented marked thus* *.]

Arts, Journal of Society of, Vol. 15, Parts 779 to 782; Vol. 16, Part 783 to 832, October 25th, 1867 to October 30th, 1868.
Arts, Society of, Transactions, 1866-7. 1 Vol. Bound.
Athenæum, Parts 478 to 489, Oct., 1867 to Sept., 1868.
*Acclimation, Soc. Imp. D'. Bulletin Mensuel, Tome 3, Nos. 2—12; Tome 4, Nos. 1—9. From the Society.
*Auriferous Drifts in Australia, by "Research." From the Author.
*Association, British, Report of, 1866. From the Association.
*Acclimatisation Society of New South Wales, Report for 1868.
*Builder, The, Nos. 202 to 212, Oct., 1867 to Aug., 1868. From Dr. Agnew.
Botanical Works of the late Robt. Browne. Vol. 2. Ray Society.
*Batman, John, Founder of Colony of Victoria, Life of. By J. Bonwick, F.R.G.S. From the Author.
*College, King's, London, Prospectus of, 1867. From Professor Tennant.
Conchologia Iconica. Parts 268 to 271.
*Chemische Untersuchung der Rinde von Petalostigma quadrilocular. By C. Franco. From Dr. F. Von Müeller, F.L.S.
*Cyclone, West India, 1867. By J.R. Eastman, United States' Navy. From F. Abbott, Esq., F.R.A.S.
*Desmidiaceæ, Observations on Tasmanian. From the Author, E. D. Harrop, Esq.
*Exhibition, Maritime of Havre, Prospectus, 1868.
*———— of Paris, 1867. Artisans' Report on, 1867. From Dr. Milligan.
*Esparto Grass, on the Cultivation of, for the Manufacture of Paper, and the Establishment of a Paper Mill in Tasmania. By J. Barnard, Esq. From the Author.
Florist and Pomologist, Nos. 71 and 72 for 1867. Nos. 1 to 10 for 1868.
*Fisheries, Salmon, England and Wales, 3rd, 4th, 5th, and 6th Annual Report of Inspectors of Ditto. Oyster and Mussel Fisheries, Report Board of Trade, 1867. Deep Sea and Coast Fisheries, Ireland, Report of Commissioners, 1866. Irish Fisheries, Report of Special Commissioners, 1866. Oyster Fisheries, Return to Order of House of Commons, 1867. From H. M. Government.
*Fauna of Tasmania, Notes on, by G. Krefft, Esq., F.L.S., C.M.Z.S., &c. From the Author.
*————————, Remarks on, by M. Allport, Esq., F.L.S., F.Z.S.
Gardeners' Chronicle, Nos. 44 to 52, Nov. 2nd to Dec. 28th, 1867; Nos. 1 to 44, Jan. 4th to Oct. 31st, 1868.
*Highlands, Leaves from the Journal of Our Life in. From Her Majesty the Queen.
Intellectual Observer, Nos. 70, 71, 72. (The title of this periodical has been changed to that of "The Student.")
*Intelligencer, Walch's Literary. Monthly.
Journal, Practical Mechanics, Nos. 32 to 43. Nov., 1867 to Oct., 1868.
————, Silliman's American, of Science and Art, Vol. 44, No. 132, Vol. 45, Nos. 133 to 137.
———— of Agriculture, Nos. 18 to 24. (Title changed to that of "The Country Gentleman's Magazine.")
————, Quarterly, of Science, Nos. 17 to 20, Jan. to Oct., 1868.
*————s of House of Assembly, Tasmania. Vols. 11 and 13. From H.M. Government.
*Length, Comparisons of Standards of, 1868. By Col. Sir R. James, R.E. From the Right Hon. the Secretary of State for War.
*Military Surgery, being Circular No. 6 of Surgeon General's Office, Washington, 1866. From United States' Government.
Magazine, Country Gentleman's (Late Journal of Agriculture), Vol. 1, Nos. 1, *2, 3, 4, July to Oct.*, 1868.

*Meteorological Observations made at Sydney, New South Wales. From G. B. Smalley, Esq., B.A., Cantab., F.R.A.S., &c. Monthly Tables for 1868.

*————————— taken at Windsor, New South Wales, from 1863 to 1866 inclusive. From J. Tebbutt, Jun., Esq.

*————————— for Hobart Town. From F. Abbott, Esq., F.R.A.S.

*————————— for Port Arthur. From J. Boyd, Esq.

*————————— for Westbury. From F. Belstead, Esq.

*————————— for Swansea. From Dr. Story.

*————————— for King's Island, Swan Island, Goose Island, Kent's Group, Mount Nelson, and South Bruni. From the Hobart Town Marine Board.

Natural History, Annals and Magazine of, Vol. 20, Nos. 119, 120; Vol. 1, (fourth series), Nos. 1 to 6; Vol. 2, Nos. 7 to 10. Nov., 1868 to Oct., 1869.

*Naturwissenchaftlichen vereine, Abhandlungen herausgegeben vom zu Bremen, 1 Bd., 2 Heft; 4 Bd., and 5 Bd. From the Author, Dr. Sonder, Sec. to Natural History Society, Hamburgh, per Dr. F. Müeller, F.L.S., &c., &c., Melbourne.

*Natural History Society, Hamburgh. Ubersicht der Aeinter, 1865. From the same.

*Notes and Queries, No. 1, Jan., 1868.

*New Zealand, its Physical Geography, Geology, and Natural History, by Dr. Hochstetter. From New Zealand Government.

*Naturgeschichte, Archive fur, No. 6, 1865; Nos. 2, 3, 4, 5, 1866; Nos. 1, 2, 3, 1867.

*New Zealand, Statistics of, 1866. From New Zealand Government.

*Oyster Culture, Pamphlet on, by J. E. Calder, Esq., Surveyor-General. From the Author.

*Prince Consort, His Royal Highness the, Early Days of, 1868. Presented by Her Majesty the Queen.

Pterlography, Nitzschs. Ray Society, Vol. for 1866.

*Perch, Reasons for Introduction of, into Tasmania.

*Reports on Materials for a Medical and Surgical History of the American Rebellion, being Circular No. 6 of Surgeon-General's Office, War Department, Washington, United States. From American Government.

*Report on Epidemic Cholera and Yellow Fever in the United States' Army, 1868, being Circular No. —, Surgeon-General's Office, 1868, Washington. From the same.

*Report, South Australian Institute, 1867—8.

*Schriften der Koniglichen Physikalisch okonomischen Gesellschaft, 2, Nos. 1865, 2 Ditto, 1866.

*Society, Royal of Victoria, Transactions and Proceedings of, Part 2, Jan., 1868. From the Society.

*Student, The (late Intellectual Observer), Nos. 1 to 9, February to October, 1868.

*Society, Geological and Polytechnic, of West Riding of Yorkshire, Report for 1867.

*———— Royal, of London, Proceedings of, Vol. 14, Nos. 78, 79; Vol. 15, Nos. 80 to 93, inclusive. From the Society.

*———— Zoological of London, Part 3, 1866; Parts 1 and 2, 1867.

*———— Zoological of London, Vol. 6, Part 6, Transactions.

Osteology of Sperm Whale *(Physeter macrocephalus)*

*———— Linnean, Proceedings of, Vol. 9, Nos. 35 to 39, Zoology; Vol. 9, Nos. 39 to 42, Botany.

*———— Geological, Quarterly Journal of, Vol. 23, Parts, 1, 2, 3, 4, 5, Nos. 89 to 93.

*————————, List of 1867.

*————, Royal Geographical, Proceedings of, Vol. 11, Nos. 1 to 6; Vol. 12, No. 1.

*—————————————, Journal of, Vol. 36, 1866.

*—————————————, Slip of Meeting of March, 1868.

*Osteology, Royal Asiatic, Journal of, Vol. 2, Part 2.
*———, Royal of Victoria, Vol. 9, Part 1, 1868.
*———, Acclimatisation, of New South Wales, 1867.
*———, Leeds Literary and Philosophical, Report 1867—8.
*Star Variable, η Argus, Observations on, by F. Abbott, Esq., F.R.A.S., &c. From the Author.
*Spectrum Analysis and its Application to Science. By the same.
*Statistics of Tasmania, 1867. From Her Majesty's Government.
*Statistical Register of Victoria, 1855.
*———, Notes of Progress of, 1835 to 1867.
*——— Summary, 1865.
*Statistics of Victoria, 1867. Part 1, "Population." Part 2, "Accumulation." Also Parts 3 and 4. From W. H. Archer, Esq., Registrar-General, Victoria.
*Tasmania, Notes on Fauna of, (3 copies), by G. Krefft, Esq., F.L.S., C.M.Z.S., &c. From the Author.
*Technologist, Vol. 1, New Series, Nos. 4 to 12. From the Editor.

LIST OF OBJECTS PRESENTED TO THE MUSEUM DURING 1868.

Allport, M., Esq., F.L.S., F.Z.S.—Specimens of Fish *(Galaxias sp.)*, from Great Lake, Tasmania; Native Freshwater Perch; English Perch, bred in the colony from ova deposited this year; specimen of young Sawfish *(Pristis)*; a young Opossum from the Pouch.

Allison, Mr., Oatlands.—Two black Magpies *(Strepera fuliginosa)*.

Agnew, Dr.—Model of a Moccasin, by — Beaumont, Esq.

Browne, His Excellency Col. T. Gore, C.B.—A specimen of the Artificial Stone of which the new Wesleyan Church at Launceston is built. A Fossil from Sandstone.

Browne, Mrs. T. Gore.—Model of the Ohyawai Pah, Bay of Island District, New Zealand, in the attack on which 127 British soldiers were killed or wounded in five minutes on the 1st July, 1845.

Boyd, J., Esq., Port Arthur.—Two Black Cockatoos *(Calyptorynchus xanthonotus)*; Skull and part of Skeleton of young Black Whale cleaned.

Buckland, J., Esq.—Two English Perch *(Perca fluviatilis)*; a beautiful specimen of the Argonaut *(Argonauta tuberculosa)*, from Kent's Group, Bass's Straits.

Cotton, F., Esq., junr.—A Lizard.

Cook, H., Esq.—Fac-Similes of the Warrants for the Execution of Mary Queen of Scots (1587), and of Charles I. (1648); also one of the "Act for establishing the Coronation Oath," 1689; and a Collection of Bulletins of the French Army, 1812 and 1815.

Clarke, Mr. R., ship "Derwent Hunter."—Eye of Sperm Whale (dried).

Collis, Mr., Recherche Bay.—An Eagle.

Crowther, Dr.—Two Fish from Lady Elliott's Island.

Calvert, C., Esq.—A small collection of Shells from King's Island.

Dennett, Mr. J., Campbell-street—One Silver Coin (½-dime), United States; one Twopenny piece, George III.; two Copper Coins; a small Medal; an Esquimaux Dress from Behring's Strait.

Downing, Mrs., Battery Point.—Specimen of Squid, and a Scorpion with 20 young ones.

Dry, Sir R., Col. Secretary.—Specimen of Arfvedsonite, from Swan Island, with report of Assay.

Forster, J., Esq.—Skull of an Aborigine, picked up at Brady's Look Out, Arthur Lakes.

Fenton, Miss.—A young Diamond Snake *(Hoplocephalus superbus.)*

Flexmore, O., Esq.—A Lizard, 13 Pebbles of Quartz, &c., and an American Note.
Gellibrand, G., Esq.—Sample of Coal from Grey River, New Zealand.
Gellibrand, W. A. B., Esq.—Two recent specimens of the Native Tiger *(Thylacinus cynocephalus)*; a Snake (young specimen of *Hopolocephalus curtus.)*
Graves, J. W., Esq.—A Partridge *(Perdix cinerea)*.
Huston, Dr.—A Cap formed from husk of Cocoa Nut, from Panama.
Hull, H. M., Esq.—A Whip Snake *(Hoplocephalus coronoides)*, and two Lizards; a young Black Snake *(Hoplocephalus curtus)*; two Iguanas *(Cyclodus nigroluteus*, Krefft).
Harburgh, Mr.—A Hermit Crab.
Joseph, Mr. G., Single Hill.—A Coot *(Fulica Australis)*.
Lord, R. D., Esq., Oatlands.—A Pair of Mountain Ducks *(Casarca tadomoides)*.
Lovett, W., Esq.—A Diamond Bird *(Pardalotus punctatus)*; and a Mountain Thrush *(Oreocincla lunulata)*.
Linley, G. W., Esq., Oatlands.—A Chestnut-faced Owl *(Strix castanops)*.
Legrand, Mr.—Specimen of Native Paper from Java.
Maning, A. H., Esq.—A White Hawk.
Moore, J. A., Esq., New Norfolk.—A Coot *(Fulica Australis)*.
Meredith, Mrs. C.—Fifty Specimens (30 varieties), Algæ, &c., from Prosser's Bay.
McDowell, Mr., Long Bay.—Two Centipedes from West Indies.
Norris, Mr. W., Huon.—Nest of Hymenopterous Insect, taken from middle of the limb of a tree.
Oldham, Mr. T.—A Spur-winged Plover *(Lobivanellus lobatus)*.
Oldham, Mr. E.—A Half-penny, William and Mary; and a half-farthing, George IV.
Officer, Hon. R.—A Platypus *(Ornithorynchus anatinus.)*
Price, W. H., Esq.—A Gannet *(Sula Australis)*.
Petterd, Mr. W. F., jun.—21 varieties Tasmanian Shells, viz.: 10 Land, 2 Freshwater, 9 Marine.
Rex, Mr. George W.—A Grebe *(Podiceps poliocephalus)*.
Roberts, H. L., Esq.—A War Dress from Pleasant Island.
Smith, J. L., Esq.—A curious Fish, found on beach at Table Cape, Tasmania.
Sharland, Miss.—A Kingfisher *(Alcyone azurea)*.
Salmon Commissioners.—A young Salmon Trout *(Salmo trutta)*, found dead in the breeding ponds, River Plenty.
Wise, Mr. T.—Skull of Seal.
Williams, Mr., Sandy Bay.—Egg cases of Sting Ray.
Waterhouse, F. G., Esq., on the part of the Trustees of the South Australian Institute Museum, Adelaide.—91 specimens (55 species) South Australian Birds.
Wintle, Mr. S. H.—Nest of Mason Wasp.
Young, Mr. J., Glenorchy.—A Petrel; a Crab from Kangaroo Point; a Grebe *(Podiceps poliocephalus)*; specimen of Hippocampus; a small shark.

PLANTS AND SEEDS RECEIVED AT ROYAL SOCIETY'S GARDENS, DURING 1868.

January 8th.—From Messrs. Taylor and Sangster, Nurserymen, Melbourne.—Box containing 24 Dahlias.
January 22nd.—From Dr. McCarthy, New Norfolk.—26 papers seeds received from Europe.
February 18th.—From Mr. C. Wren, Remuera, New Zealand.—Case containing 82 plants.

February 24th.—Mr. T. C. Carey, Western Australia.—16 Packets seeds.
March 20th.—From Mr. J. Harris, Nurseryman, Melbourne.—Case containing 47 Plants.
April 11th.—From Mr. R. Henderson, Nurseryman, Sydney.—Case containing 21 Plants.
April 18th.—From Mr. C. F. Creswell.—64 packets seeds from England.
May 15th.—From Messrs. Taylor and Sangster. —Case containing 43 plants.
May 16th.—From Mr. T. C. Carey, Western Australia. —47 packets seeds.
May 25th.—From Captain Clinch.—Seeds of Diosphros Kaki.
May 26th.—From Botanic Gardens, Ceylon.—42 packets seeds.
June 12th.—From Mr. J. Harris, Melbourne.—Case containing 36 plants.
June 20th.—From Botanic Gardens, Sydney.—Case containing 36 plants.
June 26th.—From Rev. G. Clarke.—Two cases containing collection New Zealand Ferns.
July 11th.—From Mr. J. Harris, Melbourne.—43 plants, 19 various Scions.
July 16th.—From Dr. J. Milligan, London.—37 packets seeds, distributed by London Horticultural Society.
July 20th.—From Mr. R. Henderson, Sydney.—Box containing 17 plants.
August 12th.—From Mr. William Knight,—About 10 varieties New Zealand seeds.
August 21st.—From A. Verschaffelt, Ghent, Belgium.—Box containing 391 packets seeds and 21 collections flower seeds.
September 1st.—From Mr. M. Allport.—Plant Nuphar Lutea.
September 19th.—From Melbourne Botanic Gardens.—Two cases containing 110 plants.
October 15th.—From Mr. C. T. Wren, Remuera, New Zealand.—4 plants Cyathea.
November 15th.—From Lieut. Howat.—Collection New Zealand seeds.
November 21st.—From Mr. J. Harris, Melbourne.—Case containing 13 plants.
December 4th.—From Dr. F. Mueller, Botanic Gardens, Melbourne.—8 packets seeds.
December 15th.—From Dr. F. Mueller, 9 specimens palm-seeds.

F. ABBOTT, JUN.,
Superintendent R. S. Gardens.

* * *

PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1868.

January 25th, per "Wagoola."—To Ambroise Verschaffelt, Ghent, Belgium, 3 large plants, Dicksonia Antartica.
February 18th.—To A. Verschaffelt, per Windward.—10 small plants, Dicksonia Antarctica.
February 19th.—To Mr. J. Harris, Nurseryman, Melbourne.—Case containing 63 plants, 74 varieties bulbs, 50 packets seeds.
March 17th.—To Mr. R. Henderson, Nurseryman, Sydney.—134 varieties bulbs.
March 25th.—Messrs. Taylor and Sangster, Nurserymen, Melbourne.—133 varieties bulbs, 29 packets seeds.
March 25th.—Messrs. Handasyde and Co., Melbourne.—70 varieties bulbs, 62 packets seeds.
March 26th.—To Dr. R. Schomburgh, Botanic Gardens, Adelaide, 133 varieties bulbs, 29 packets seeds.
April 13th, per Harrowby.—To A. Verschaffelt.—12 plants Dicksonia Antarctica.
April 22nd.—To Messrs. Taylor and Sangster, Melbourne.—One case containing 40 plants.
April 28th.—To Mr. R. Henderson, Sydney.—Collection seeds.

June 17th.—To Messrs. Taylor and Sangster.—Packet bulbs.
July 30th.—To Mr. C. T. Wren, Remuera, New Zealand.—55 plants, 75 varieties bulbs.
August 8th.—To Mr. R. Henderson, Sydney.—24 plants, 8 varieties cuttings.
October 7th.—To the Botanic Gardens, Melbourne.—Packet seeds.
November 2nd.—To Mr. J. Dickinson, Port Arlington, Victoria.—30 varieties succulents.
November 2nd.—Mr. C. F. Creswell.—Collection seeds.
December 16th.—His Excellency Colonel Gore Browne.—180 packets Australian seeds.

F. ABBOTT, Jun.,
Superintendent R. S. Gardens.

PLANTS SUPPLIED FOR DECORATION OF PUBLIC PLACES DURING 1868.

April 29th.—For decoration of the grounds of Cascade Invalid Depôt.—40 plants.
August 7th.—For decoration of the Asylum for Insane, New Norfolk.—82 plants.

F. ABBOTT, Jun.,
Superintendent R. S. Gardens.

TENCH FISH SUPPLIED FROM THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1868.

August 11th.—To Mr. Hiddlestone, Nelson, New Zealand...	7
October 23rd.—To J. W. Graves, Esq.	17
Total	24

F. ABBOTT, Jun.,
Superintendent R. S. Gardens.

LIST OF PLANTS

INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1868.

Abobra viridiflora
Acacia thozetiana
Acer neapolitana
Agnostus salignus
„ sinuatus
Amaranthus tricolor
Andromeda polifolia
Antirrhinum azoricum
Aphelandra Leopoldi
Aquilegia jacunda
Araucaria glauca
„ intermedia
Aralia parvifolium
„ reticulata
Arbutus glauca
Aristolochia Bonplandi
Aubretia purpurea
„ spathulata

Balsamita grandiflora
Banksia grandis
Berberis purpurea
„ fuschioides
„ illicifolia
Bignonia Wallichiana
Bocconia frutescens
Bomaria occulata
Bravoa germiniflora
Brachychiton Dalebachi
Bromelia Ananas
Browallia pendula
Bryonia alba
„ dioica

Caesalpinia Sappan
Calliprora lutea
Callabris columullaris
Camassia esculenta
Campanula Celsii
„ lacteum
„ Vidalli
Candollia sps.
Canna coccinea
„ Karsteniana
Caosia sps.
Carya Amara
Cassia dimidiata
Cathartocarpus Brewsteri
Celastrus angularis
Cerissa arduina
Chaenastus lanceolata
Cheiranthus maritimus bicolor
Chironia Lindlyana
Cinchonia Calisaya
Cissus Baudiniana
„ heterophylla variegata
Cladanthus chinensis
„ fragrans
Cocos plumosa
Coccoloba plattyclada
Coleus Gibsoni
Cordyline Banksii
Cotoneaster buxifolia
„ Hookeri
Crocus speciosus
Cuphea jorulensis
„ splendens
Cupressus glandulosa
Cyathea dealbata
„ medullaris
Cydonea Moorlosa
Cypella Herbertii

Dacrydium excelsum
Dianthus imperialis
„ laciniatus
Diosma uniflora
„ virgata
Diospyros spathulata
Dodonœa humilis

Edwardsia grandiflora
Elaeagnus fusca
„ hortensis
„ orientalis
„ sativa
Elaeocarpus grandis
Eranthemum tetragonum
Erica Andromedæ-flora
„ Bowiana
„ cerinthoides
„ concinna
„ sabana rubra

Fraxinus aurea
Forsythia Fortuni

Globularia salicina
Grevillea longifolia
„ microstylis
„ Hilli
Gypsophila saxifraga

Hardenbergia cyanea
„ Lindlyana
Hartogea capensis
Hedycaria dentata
Hemicyclia sepiaria
Hemigenia microphylla
Hibiscus tiliaceus
„ tricolor
Hypoxis stellata

Iberis Gibraltica
„ linifolia
„ pinnata
Iris alata
Ilex nobilis
Indigofera decora
Inhofia crispa
Ipomæa grandiflora
Ipomopsis atrorosea

Jasminum suavistrum
Juglans cineria
Juniperus attica
„ Dahurica

Kennedya Barclayana

Lachenalia erecta
Lantana var Goliath
„ „ Imperatrice Eugene
Larix Americana
Lavendula abrotanoides
„ dentata
Leichardtia Macleyana
Lentis rhyncocarpus
Leucocoryne alliacea
Libertia paniculata
Ligularia Kaempferi argentea
Ligustrum Calfornicum
„ undulatum
„ spicatum
Lonicera capitatum
Loxostylia alata

Magnolia cordifolia
„ gracilis
„ Soulangeana
Mimosa Caveana
Monetia barlereoidese
Morinda citriodora
Musa ornata
Myaris jaqualis
Myoporum diffusum
Myrtus Bullatus

Nerine flexuosa
Nierembergia gracilis
„ frutescens

Nyctarinia selaginoides

Oenothera chrysantha
„ pumila

Olea Americana
„ sativa
Owenia venosa
Oxalis esculenta
„ hirta
„ liliana
„ tetraphylla
„ umbrosa
Oxera pulchella

Paliurus aculeatus
Panax sieboldtii
Passiflora Count Nesselrode
„ limbata
„ macrocarpa
Pelargonium Magnistipula
Phormium Colensoi
Physalis alkekengi
Pinus Pallasiana
„ Pindrow
„ sinensis
Pisonia Brunoniana
Pittosphorum Colensoi
Planera acuminata
Plectoria ventosa
Polygala attenuata
„ bracteata
Populus argentea
Prostanthera spinosa
Primula acaulis

Quercus Castana
„ coccinea
„ discolor
„ macrocarpa
„ prinos discolor

Raphiolepis ovata
„ salicifolia
Rhamnus papillosus
Rhodorrhiza florida
Robinia sophoroides
„ tortuosa

Sabal palmetto
Salix aurea
„ caprea variegata
Salvia africana
„ japonica
Sapindus sappea
Sciadophyllum speciosum
Scutellaria oblonga
Sedum carneum variegatum

Sedum crimæense
Silene retinoides
„ schafta
Sophora tomentosa
„ violacea
Spanoghia nephiloides
Sparto-cytisus nubigenus
Statice Thouini
Stenocarpus salignus
Strumaria crispa

Taxodium passerinoides
Thuja glauca vera
„ gracilis
„ nana
„ Skinneri
Tropœolum arvense
Tunica saxifraga

Urolepis cuprea

Verbena aubletia
Veronica buxifolia
„ ellliptica
„ Halkei
„ Leitchfieldi
„ selaginoides
Verticordia ericoides
Vesicaria gracilis
Vinca majæ-folia reticulata
Viola cornuta Czar
„ „ Mavue Queen
„ „ purple Queen
Viscaria elegans picta

Yucca crenulata
„ gigantea

Ziziphus macrocarpa
„ sinensis

CAMELLIA.

Candidissima
Duchesse d'Orleans
Euterpe
Fimbriata
Henri Favre
Imogen
Iris
Imbricata alba
Jubilee
Modesta
Miniata
Perdita
Princess Bociocchi

AZALEA.

Chelsoni
Colonel Napier
Criterion
Danielsiana
Georgiana
Ponticum aurea
Rawsoni
Rosea superba

ROSES.

Acidalie
Beauty of Botany
Baron Adolph de Rothschild
Charles Lefebvre
Duchesse de Medini Cœli
Duc de Rohan
Duchess de Caylus
Duc de Cazes
Eugene Appert
George Prince
Gloir de Digon
Gloir de Santenay
Gloir de Vitry
Jean Rosan Krantz
John hopper
Lord Macaulay
Lord Clyde
Maurice Bernardin
Madame Charles Crapelet
„ Rivers
„ Boll
„ Derreux Douville
„ Clemence Joigneux
„ de Rougemont
Marechal Neil
„ Vaillant
Pierre Notting
Prince Camille de Rohan
Seur des anges
Souvenir de Compt Cavour
Triumph de Rennes
Vangueur de Goliath
Vicompt Vizier

FUCHSIA.

Norfolk Giant

GERANIUM.

Bijou
Black Dwarf
Cloth of Gold
Diadem
Flower of Spring

Fireball
Galatea
Golden Fleece
Huntsman
Mrs. Polock
Monsieur Margereal
Mountain of Light
Queen of May
Rosy Morn
Silver Queen

PHLOX.

Andromeda
Borel
Diomede
Jeanne d'Arc
Madame A. Pothier
" Ladoucet
Monsieur Chauviere
" Gustave Duchesne
Monsieur Lacarte
Parmentiere

APPLE.

Catshead Codlin
Golden Noble
Forge

PEAR.

Compt de Lamy

PLUM.

Mitchelson

CHERRY.

Belle d'Orleans
Monstreuse de Bavy
Reine Hortense

STRAWBERRIES.

Belle de Bordelaise
Eclipse
Oscar
Premier
Sir Harry
White Chilian

Olea Bouguilliert
" Verdol

F. ABBOTT,
Superintendent.

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APPENDIX.

NOTES

ON THE

FAUNA OF TASMANIA,

BY

GERARD KREFFT, F.L.S., C.M.Z.S., &c., &c.,

CURATOR AND SECRETARY OF THE AUSTRALIAN MUSEUM.

[Re-printed for the Papers and Proceedings of the Royal Society of Tasmania.]

PREFACE.

THE "Notes on the Tasmanian Fauna" have been printed for private circulation only, and principally with a few to draw the attention of our fellow colonists to the productions of their island which are not so well known as might have been expected from the length of its colonization.

It is to be hoped that any omissions on my part will be speedily corrected by resident naturalists; the fishes inhabiting the fresh water streams deserve particular attention, as only four species have been described, though probably many more exist.

According to some residents a species of Flying Phalanger is found in certain parts of the island, said to be introduced from Victoria; if this statement is correct, the animal should be included in the list.

NOTES ON THE FAUNA OF TASMANIA.

THE following remarks suggested themselves to the writer, after examination of a magnificent series of specimens of Natural History, collected in Tasmania by Mr. George Masters, assistant curator of the Australian Museum, Sydney, who visited Tasmania about a year ago, on behalf of the Trustees of that institution.

It will be observed that, excepting some of the Whales, specimens of all the Mammals known to exist in the island were brought together, not only their skins but also a fine series of skeletons, and young from the pouch, besides a large number of skulls, proving the existence of another species of Thylacine.

The following is a list of the Mammals collected:—

PLACENTALIA,

Producing their young in a perfect state and having no pouch or skin-fold for their protection:—

1.	*Canis dingo*	The Dingo (now extinct).
2.	*Arctocephalus lobatus*	The Cowled Seal.
3.	*Stenorhynchus leptonyx*	Sea Leopard
4.	*Vespertilio tasmaniensis*	Tasmanian Bat
5.	*Scotophilus microdon*	Small-toothed Bat.
6.	*Nyctophilus unicolor*	Long-eared Bat.
7.	*Hydromys chrysogaster*	Golden-bellied Beaver Rat.
8.	*Mus tasmaniensis*—(Kr.,)	a new species of land-rat discovered by Mr. George Masters, on the banks of the Ouse River. Except this rat, all the animals mentioned are also found in Victoria and New South Wales.

IMPLACENTALIA.

Producing their young in a very imperfect state and having a pouch or skin-fold for their protection.

Section I.—*Marsupialia.*

WOMBAT FAMILY.

Phascolomys wombat........ The Tasmanian Wombat.

KANGAROO FAMILY.

Halmaturus bennettii	Bennett's Kangaroo.
Halmaturus billardieri	Tasmanian Wallaby.
Macropus major	Great or Common Kangaroo.
Bettongia cuniculus	Tasmanian Bettong
Hypsiprymnus apicalis	Tasmanian Rat-Kangaroo.

BANDICOOT FAMILY.

Perameles gunnii	Gunn's Perameles.
Perameles obesula	

PHALANGER FAMILY.

Phalangista fuliginosa	Black or Sooty Opossum.
Phalangista vulpina	Common Opossum.
Phalangista viverrina	Ring-tail Opossum.
Dromicia gliriformis	Thick-tailed Dromicia.

DASYURE FAMILY.

Antechinus swainsonii	Swainson's Antechinus.	
Dasyurus viverrinus	Common Dasyure or Native-Cat.	
Dasyurus maculatus	Spotted-tailed Dasyure or Tiger-Cat.	
Sarcophilus ursinus	Tasmanian Devil,	(fossil in N.S. Wales.)
Thylacinus cynocephalus	Tasmanian Tiger,	

Section II.—*Monotremata.*

Ornithorhynchus anatinus	Duck-billed Platypus.
Echidna setosa	Hairy Echidna.

A second species of Thylacine recently obtained by Mr. Masters, and which I have described in the Proceedings of the Zoological Society of London as *Thylacinus breviceps*, must be added to this list.

This is a smaller animal with a shorter head, and much larger teeth than the *T. cynocephalus*, and was well known to many of the old residents of Van Diemen's Land who distinguished the two kinds, so Mr. Masters assures me, by the popularnames of Grey-hound and Bull-dog Tigers.

Peculiar to the island are the following mammals :—

The Tasmanian Wombat.
Bennett's Kangaroo.
The Tasmanian Rat Kangaroo
Gunn's Bandicoot.
The Sooty Phalanger.
Thick-tailed Dromicia.
The Tasmanian " Devil "
The Two " Tigers" ; and
The Hairy Echidna or Porcupine Anteater.

With the exception of the "Devil" and "Tigers" all have closely allied representatives on the mainland.

A colder climate always modifies species more or less, and we find the Mammals of Tasmania generally more robust, of larger size, and provided with thicker and darker fur, than those inhabiting New Holland. In the structure, however, of the skull and teeth, but little difference (except in size), is observable in Tasmanian specimens when compared with continental ones. Comparing the fauna of Tasmania with that of the Australian mainland, we arrive at the following result

The Dingo is extinct,—the Seals and Whales are the same as on our own coast. The insect fauna of the island not being very rich, there are but few insect-feeding bats, three species only are known to our twenty or more *Cheiroptera.* For similar reasons (the absence of indigenous fruits) no Flying-foxes occur, though if these marauders once found out the richness of Tasmanian plantations, they would soon wing their way across the Straits.

The peculiar Australian Rodent, the Water-rat, or Beaver-rat, is represented by a single species to five on the mainland. Some four or five and twenty other rats and mice are known to inhabit Australia, and only one kind Tasmania. The marsupial order is richer, but here again many species common to our south coast are missing. There are but three *Halmaturi*, while some forty species inhabit the continent.

Our ten or twelve "Kangaroo-Rats" and "Bettongs," have two representatives in Tasmania, both of which, curious to say, resemble in a most remarkable degree two West Australian species, so much so, that the one can only be distinguished from the other by a close comparison of their skeletons.

One would naturally conclude that a mountainous island like Tasmania, would be the very paradise of "Rock-Wallabies," but none are found there. The absence of the "Koala," or Native Bear, and of all the species of "Flying Phalangers," common in Victoria, is also unaccountable, the more so as the allied "Phalangers," better known as "Brush and Ring-tail Opossums," which subsist on similar food and live in the same forests, thrive well, and attain a great size in that Island.

The small marsupial insectivora allied to the genera *Podabrus* and *Antechinus*, are represented in the latter by a single species, though probably a second kind exists, as I received a new form from one of the islands of Bass's Straits, not long ago, which is perhaps also found in Tasmania.

The predominance of the large carnivora over all other animals, is most likely the cause of so limited a number of species; it is highly probable that many more kinds of Kangaroos once existed, and that they have been exterminated by the ferocious "Tigers" and "Devils" still plentiful in some of the wild districts; if so, their remains will tell whenever the bone-caverns are explored.

The monotremous section of the *Implacentalia* is represented as in Australia by the well known Platypus, and by an Echidna or Ant-eater which appears to differ from our own in nothing but the shorter spines and more hairy fur.

The birds observed amount to one hundred and sixty-two species as follows:—

ORDER—RAPTORES.

FAMILY FALCONIDÆ.

Aquila audax	Eagle Hawk.
Ichthyiaëtus leucogaster	White-bellied Sea Eagle.
Pandion leucocephalus	White-headed Osprey.
Falco melanogenys	Blacked-cheeked Falcon.
Falco lunulatus	White-fronted Falcon.
Ieracidea berigora	Brown Hawk.
Astur novæ hollandiæ	New Holland Goshawk.
Astur approximans	Australian Goshawk.
Accipiter torquatus	Collared Sparrowhawk.
Circus assimilis	Allied Harrier.

FAMILY STRIGIDÆ.

Strix castanops	Chestnut-faced owl.
Athene maculata	Spotted Owl.

ORDER—INSESSORES.

FAMILY CAPRIMULGIDÆ.

Ægotheles novæ-hollandiæ	Little Morepork.
Podargus cuvieri	Morepork.

FAMILY HIRUNDINIDÆ.

Acanthylis caudacuta	Spine-tailed Swallow.
Hirundo frontalis	Welcome Swallow.
Collocalia arborea	Tree Swallow.

FAMILY ALCEDINIDÆ.

Alcyone diemenensis	Tasmanian Kingfisher.

FAMILY ARTAMIDÆ.

Artamus sordidus	Wood Swallow.

FAMILY AMPELIDÆ.

Pardalotus punctatus	Diamond-bird.
Pardalotus affinis	Allied Diamond-bird.
Pardalotus quadragintus	Forty Spotted Pardolote.

FAMILY LANIADÆ.

Strepera fuliginosa	Sooty Crow-Shrike.
Strepera arguta	Hill Crow-Shrike.
Gymnorhina organicum	Tasmanian Crow-Shrike.
Cracticus cinereus	Cinereous Crow-shrike.

FAMILY CAMPEPHAGINÆ.

Graucalus parvirostris	Tasmanian Graucalus.
Pachycephala graucalus	Grey-tailed Thickhead.
Pachycephala olivacea	Native Thrush.
Colluricincla selbii	Whistling Dick.

FAMILY MUSCICAPIDÆ.

Rhipidura albiscapa	White-shafted Fantail.

FAMILY SAXICOLIDÆ.

Erythrodryas rhodinogaster	Pink-breasted Wood Robin
Petroica multicolor	Scarlet-breasted Robin.
Petroica phœnicea	Flame-breasted Robin
Petroica fusca	Dusky Robin.

FAMILY MALURIDÆ.

Malurus longicaudus	Blue Wren.
Stipiturus malachurus	Emu Wren.
Sericornis humilis	Sombre Sericornis.
Acanthiza diemenensis	Tasmanian Acanthiza.
Acanthiza magna	Great Acanthiza.
Acanthiza chryssorrhœa	Yellow-rumped Acanthiza.
Calamanthus fuliginosus	Striated Calamanthus.

FAMILY MOTACILLIDÆ.

Anthus australis	Australian Pipit.
Sphenœacus gramineus	Tawny Grass-bird.

FAMILY FRINGILLIDÆ.

Estrelda bella	Fire-tail.

FAMILY MERULIDÆ.

Cinclosoma punctata	Spotted Ground Thrush.
Oreocincla lunulata	Mountain Thrush.

FAMILY CORVIDÆ.

Corvus australis	White-eyed Crow.

Family Meliphagidæ.

Meliphaga novæ hollandiæ	New Holland Honey-eater.
Meliphaga australasiana	Tasmanian Honey-eater.
Glyciphila fulvifrons	Fulvus-fronted Honey-eater.
Ptilotis flavigula	Yellow-throated Honey-eater.
Anthochœra inauris	Wattle-bird.
Anthochœra mellivora	Brush Wattle-bird
Acanthorhynchus tenuirostris	Cobbler's Awl.
Melithreptus validirostris	Strong-billed Honey-eater, or Cherry-picker.
Melithreptus melanocephalus	Black-headed Honey-eater.
Myzantha garrula	Miner.
Zosterops cœrulescens	Grey-backed Zosterops.

Family Cuculidæ.

Cuculus inornatus	Plain Cuckoo.
Cuculus cineraceus	Grey Cuckoo.
Chrysococcyx lucidus	Bronze Cuckoo.

Family Psittacidæ.

Cacatua galerita	Common Cockatoo.
Calyptorhynchus xanthonotus	Black Cockatoo.
Callocephalon galeatum	Gang Gang Cockatoo.
Platycercus flaviventris	Green Parrott.
Platycercus eximius	Rose Hill Parrakeet or Rosella
Euphema chrysostoma	Blue-banded Grass-Parrakeet.
Euphema aurantia	Orange bellied Grass-Parrakeet
Pezoporus formosus	Swamp Parrakeet.
Lathamus discolor	Swift Parrakeet.
Trichoglossus swainsonii	Blue Mountain Parrakeet.
Trichoglossus concinnus	Musk Parrakeet.
Trichogolossus pussilus	Small Parrakeet.

ORDER—RASORES.

Family Columbidæ.

Phaps chalcoptera	Common Bronze-wing.
Phaps elegans	Brush Bronze-wing.

Family Turnicidæ.

Turnix varius	Painted Quail.

Family Perdicidæ.

Coturnix pectoralis	Pectoral Quail, Stubble Quail.
Synoicus australis	Brown Quail.
Synoicus diemenensis	Tasmanian Partridge.

ORDER—GRALLATORES.

FAMILY STRUTHIONIDÆ.

Dromaius novæ hollandiæ	Emu, extinct; no specimens having been observed for thirty years.

FAMILY CHARADRIADÆ.

Hæmatopus longirostris	White-breasted Oyster-catcher
Hæmatopus fuliginosus	Black Oyster-catcher.
Sarciaphorus pectoralis	Black-breasted Plover.
Squatarola helvetica	Grey Plover, or Sand Piper.
Charadrius orientalis	Golden Plover.
Hiaticula monacha	Hooded Dottrel.
Hiaticula ruficapilla	Red-capped Dottrel.
Hiaticula inornata	Allied Dottrel.
Hiaticula bicincta	Double-banded Dottrel.

FAMILY RECURVIROSTRIDÆ.

Recurvirostra rubricollis	Red-necked Avocet.
Limosa uropygialis	Barred-rumped Godwit.

FAMILY TRINGIDÆ.

Schœniclus australis	Marsh Tringa.
Schœniclus subtorquatus	Curlew Sandpiper.
Schœniclus albescens	Little Sandpiper.
Strepselas interpres	Turnstone.

FAMILY SCOLOPACIDÆ.

Gallinago australis	New Holland Snipe.

FAMILY TANTALIDÆ.

Numenius australis	Australian Curlew.

FAMILY ARDEIDÆ.

Ardea novæ-hollandiæ	Blue crane.
Botaurus australis	Australian Bittern.

FAMILY RALLIDÆ.

Porphyrio melanotus	Red-bill.
Tribonyx mortierii	Native Hen.
Rallus lewinii	Lewin's Rail.
Rallus pectoralis	
Porzana fluminea	Spotted Water Crake.
Porzana palustris	Little Water Crake.
Porzana immaculata	Little Swamp Hen

ORDER—NATATORES.

Family Anatidæ.

Cygnus atratus	**Black Swan.**
Cereopsis novæ-hollandiæ	**Cape Barren Goose.**
Casarca tadornoides	**Mountain Duck.**
Anas superciliosa	**Black Duck.**
Anas punctata	**Teal.**
Spatula rhynchotis	**Shoveller.**
Malarcorhynchus membranaceus	**Pink-eyed Duck.**
Nyroca australis	**White-winged Duck.**
Biziura lobata	**Musk Duck.**

Family Laridæ.

Larus pacificus	**Pacific Gull.**
Xema jamesonii	**Jameson's Gull.**
Lestris cattarractes	**Skua Gull.**
Sylochelidon strenuus	**Caspian Tern.**
Thalasseus poliocercus	**Bass's Straits Tern.**
Sterna gracilis	**Graceful Tern.**
Sternula nereis	**Little Tern.**

Family Procellaridæ.

Diomedea exulans	**Wandering Albatros.**
Diomedea cauta	**Shy Albatros.**
Diomedea culminata	**Culminated Albatros.**
Diomedea chlororhynchos	**Yellow-nosed Albatros.**
Diomedea melanophrys	**Black-eyebrowed Albatros.**
Diomedea fuliginosa	**Sooty Albatros.**
Procellaria gigantea	**Giant Petrel.**
Procellaria conspicillata	**Spectacled Petrel.**
Procellaria hasitata	**Great Grey Petrel.**
Procellaria macroptera	**Great Winged Petrel.**
Procellaria atlantica	**Atlantic Petrel.**
Procellaria solanderii	**Solander's Petrel.**
Procellaria leucocephala	**White-headed Petrel.**
Procellaria mollis	**Soft-plumaged Petrel.**
Procellaria leucoptera	**White-winged Petrel.**
Procellaria cookii	**Cook's Petrel.**
Procellaria cœrulea	**Blue Petrel.**
Procellaria glacialoïdes	**Silvery-grey Petrel.**
Puffinus brevicaudatus	**Short-tailed Petrel.**
Daption capensis	**Cape Pigeon.**

Prion turtur	Whale Bird.
Prion ariel	Fairy Whale Bird.
Prion banksii	Bank's Whale Bird.
Prion vittatus	Broad-billed Whale Bird.
Thalassidroma nereis	Grey-backed Storm Petrel.
Thalassidroma wilsonii	Wilson's Storm Petrel.
Thalassidroma melanogaster	Black-bellied Storm Petrel.
Thalassidroma leucogaster	White-bellied Storm Petrel.
Puffinuria urinatrix	Diving Petrel.

FAMILY PELILICANIDÆ.

Pelecanus conspicillatus	Australian Pelican.
Phalacrocorax novæ-hollandiæ	Australian Cormorant.
Phalacrocorax leucogaster	White-breasted Cormorant.
Phalacrocorax melanoleucus	Little Cormorant.
Sula australis	Australian Gannet.

FAMILY PODICIPIDÆ.

Podiceps australis	Diver.
Podiceps poliocephalus	Grey-headed Diver.
Podiceps gularis	Black-throated Diver.

FAMILY SPHENISCIDÆ.

Eudyptes chrysocome	Crested Penguin.
Spheniscus minor	Little Penguin.
Spheniscus undina	Fairy Penguin.

Of the above list, forty-three are roaming sea birds, only twenty-six kinds are peculiar to the island, and six of these are very doubtful species, so that we cannot put down more than twenty birds, so limited in their habitat.

The most interesting of them are the large Gill-bird *Anthochœra inauris;* the Tasmanian Parrakeet, *Platycercus flaviventris ;* the large Quail, *Synoicus dimenensis ;* and the great Water-hen, *Tribonyx mortierii.*

The reptiles, as might be expected from a cold climate, are few in number. I do not think that Tasmania furnishes more than two or three species to the Australian fauna. The well known *Hinulia whiteii*, the peculiar *Omolepida casuarinæ*, a *Grammatophora*, two small species of *Hinuliæ*, and a *Cyclodus* *(Cyclodus nigroluteus)*, allied to our " Sleeping Lizard," are all the saurians known to exist there.

No tortoise inhabits the Tasmanian streams. Snakes abound, but the number of species is limited to two highly venomous kinds, and a small one, venomous but not dangerous. Not a single innocuous snake has as yet been discovered.

All the snakes belong to the peculiar Australian genus *Hoplocephalus*, and are local varieties of continental forms. They go under different names in Tasmania however, such as "Black Snake," "Carpet Snake," and "Diamond Snake."

The first two are varieties of our "Brown-banded Snake," *Hoplocephalus curtus*, and named "Black Snake" if of a dark color; and "Carpet Snake," if light, with the cross-bands visible. The Museum is indebted to Mr. Masters for a fine series of both, and having taken thirty-five young (some black, and some with visible cross-bands) from the same mother, the identity of both is sufficiently proved.

The term "Carpet Snake" is not well chosen, and leads to frequent mistakes here and in Tasmania, as our own "Carpet Snake" *(Morelia variegata)*, belongs to the Python tribe and is not venemous.

The second dangerous snake is *Hoplocephalus superbus*, the "Tiger Snake" of Victoria, known to Tasmanians as the "Diamond Snake," another popular name which leads to confusion if we bear in mind that the "Diamond Snake" *(Morelia spilotes)* of the south-eastern coast of New South Wales is a member of the Python family and harmless.

The third venemous snake is the *Hoplocephalus coronoides*, or "Black-bellied Snake," of small size and wide range. This snake, even when handled, seldom, if ever, offers to bite, and the wound caused by it is not as bad as the sting of a bee.

Two other small snakes *(Brachysoma bimaculatum* and *B. calonotos*), discovered by Mons. Verreaux in 1844, are mentioned by Messrs. Dumeél and Bibron, as inhabitants of Tasmania; since then no more specimens have come to hand from the same locality, and we may fairly conclude that the habitat given by M. Verreaux is erroneous.

The Tasmanian frogs are also few in number. The *Hylæ*, or "Tree Frogs," represent three species, viz., the common "Golden Tree Frog," *Hyla aurea;* "Ewing's Tree Frog," *Hyla ewingii;* and a kind, which I consider to be identical with *Hyla verreauxii*, all of which are common on the mainland of Australia. Of Swamp-frogs, we find the widely distributed *Limnodynastes tasmeniensis*, a *Pseudophryne* discovered by Mr. Masters, and probably new, *Pterophrynus tasmaniensis* and *P. lævis*, the two latter much infected by the larvæ of a small fly of the Genus *Batrachyomya* (Macleay), which insects are also found on allied species in Australia.

These are all the species of frogs known from Tasmania, up to the present time.

The fishes, such as inhabit fresh water only, are also limited. No *Eleotris*, known here as the "Gudgeon," is as yet recorded, though the genus exists in Australia, New Zealand, and South America ; of the *Galaxidæ*, the so-called "Black-fish," appears to be most common in the Tasmanian streams; this is Richardson's *Galaxias truttaceus;* we also have specimens of the *Galaxias attenuatus*, from the Ouse River, collected by Mr. Masters; the "Common Eel," *Anguilla australis*, and the well known "Fresh-water Herring," *Prototroctes maræna.* I wish I could have added the Salmon, but at present no authenticated specimens exist in any of our colonial museums. Competent judges state that the Salmon has been duly acclimatized, and has been frequently observed in the Derwent, it is therefore much to be regretted, that no specimen has yet been caught, if only to prove beyond doubt the success of one of the greatest experiments of modern times.

In summing up the whole Vertebrata of the island, leaving out the extinct Dingo, Seals, Whales, and Marine fish, we find there are

27 Mammals
162 Birds
6 Lizards
3 Snakes
7 Frogs, and
4 Fresh-water Fishes.

Together 209 Vertebrata

about thirty-seven of which may be considered peculiar to Tasmania.

The Invertebrata were collected to the number of more than one thousand species, that is to say, of the class Insecta, nine hundred and fifty species, and ninety-eight of the class Mollusca; twenty-one of the latter are Land-shells, and nearly all peculiar to Tasmania. The insects appear, with few exceptions, to be identical with Australian species.

The following is a list of the Invertebrata :—

CLASS INSECTA.

ORDER—COLEOPTERA.

640 species, and 7662 specimens.

ORDER—DIURNAL LEPIDOPTERA.

Papilio macleayanus.
Pyrameis itea.
Pyrameis cardui.
Junonia vellida.
Lasiommata merope.
Lasiommata philerope.
Lasiommata singa.
Lasiommata lathoniella.
Lasiommata hobartia.
Satyrus (one very rare species).
Lycæna (four species).
Pamphila (two species.)
Together sixteen species of Lepidoptera.

ORDER—HYMENOPTERA.

90 species and 478 specimens.

ORDER—DIPTERA.

86 species and 689 specimens.

ORDER—NEUROPTERA, ORTHOPTERA, &C.

14 species.

ORDER—HEMIPTERA.

70 species and 394 specimens.

ORDER—HOMOPTERA.

34 species and 137 specimens.

CLASS MOLLUSCA.

98 species and 960 specimens, whereof the following are Land shells, and, except *Helix morti,* are all peculiar to Tasmania.

Helix minima *(Cox)*
Helix subangulata *(Pfr.)*
Helix bombycina *(Pfr.)*
Helix diemenensis *(Cox)*
Helix morti *(Cox)*
Helix tasmaniæ *(Cox)*
Helix hobarti *(Cox)*
Helix legrandi *(Cox)*

Helix similis *(Cox)*
Helix lampra *(Pfr.)*
Helix lamproides *(Cox)*
Helix wellingtonensis *(Cox)*
Helix launcestonensis *(Reeve)*
Helix bisulcata *(Pfr.)*
Helix sinclairi *(Pfr.)*
Helix hamiltoni *(Cox)*
Bulimus dufresnii *(Leach)*
Bulimus tasmanicus *(Pfr.)*
Vitrina milligani *(Pfr.)*
Vitrina verreauxi *(Pfr.)*
Succinea australis *(Fer.)*

TASMANIA: PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.

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OF THE

ROYAL SOCIETY

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ERRATA.

Page 6.—Sixth line from bottom, for "pieced," read "placed."

Page 12.—First line, for "heptica," read "hepatica."

Page 59.—Twelfth line, for "Eudochrome," read "Endochrome."

ROYAL SOCIETY.

MARCH, 1869.

The monthly evening meeting of the Fellows, the first of the present session, was held on Tuesday, the 9th March, J. Barnard, Esq., in the chair.

The Hon. Secretary (Dr. Agnew) laid on the table the following returns :—

1. Visitors to Museum (February), 887.
2. Ditto to Gardens (February), 1,911.
3. Plants, &c., received at Gardens (February) :—From the Acclimatisation Society, Christchurch, New Zealand, seeds of Areca sapida, and Cordyline indivisa.
   From Mr. C. F. Creswell, 11 packets seeds and 9 species of bulbous plants received from England.
4. Seeds sent from Gardens :—
   To A. Verschaffelt, Ghent, Belgium, one packet of seeds of Areca sapida.
5. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
6. Books and periodicals received during January and February.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq., tables for January and February.
2. Port Arthur, from J. Boyd, Esq., table for January.
3. Swansea, from Dr. Story, ditto, ditto
4. Westbury, from F. Belstead, Esq., ditto, ditto and February.
5. Adelaide, South Australia, from C. Todd, Esq., Government Observer, tables for December, 1868.
6. Sydney, New South Wales, from C. R. Todd, Esq., Government Observer, tables for December and January.

The presentations were as follows :—

1. From J. Milligan, Esq., London.
   (*a*). Seven packages of Tasmanian plants, named by Dr. Hooker, of Kew.
   (*b*). Two ditto Italian plants.
   (*c*). Six specimens of *Calymene Blumenbachii* from Wenlock Shale, Gotland
   (*d*). Specimen of Esparto Grass.
2. From G. Whitcomb, Esq. :—
   (*a*). Sample of coal from Lambton Colliery, Newcastle, and Bituminous Shale from Hartley, New South Wales.
   (*b*). Sample of Sugar Cane-grown in Queensland.
3. From G. Krefft, Esq., Sydney Museum, per M. Allport, Esq., five prepared skins of birds from King George's Sound.
4. From Mr. R. T. Dyer, Brighton, an Albino variety of the Rosella Parrot (*Platycercus eximius*).
5. From the Hon. R. Officer, a White Hawk.
6. A Goshawk (*Astur approximans*).

7. From S. Hannaford, Esq., specimen of *Sipunculus* from Corio Bay, Geelong.
8. From Captain T. Nichols, Skeleton of a Fish from Howe's Island.
9. From Mr. J. Kelly, One Shilling of Queen Anne, 1707, and a Danish Copper Coin, 1771.
10. From Mr. S. H. Wintle :—

(a). A Vegetable Impression in Shale, from a height of between three and four thousand feet on Mount Wellington *(Endogenophyllites Wellingtonensis.* McCoy.)

(b). A Cluster of Plant Impressions from a Claystone Formation in Patrick-street.

[In reference to this specimen, Mr. Wintle mentioned in his note that he had for a number of years past been in the habit of examining the formation from which it was obtained, whenever he happened to be in the locality, but had not succeeded in finding any trace of organic structure until about three weeks ago, when he discovered several impressions similar to those presented. He also stated that he had sent some to Professor McCoy, who considers them of great importance, and will shortly determine the position they hold in the scale of fossil flora.]

(c). Fragments of Shale, bearing impressions of Cryptogamic Plants from New Town.

(d). Specimen of Pholas sp. from Rocks below Sandy Fay.

(e). Collection of specimens of Coleoptra, &c.

(f). Gall Fly and Nest, also a smaller species, with its Larva.

The Hon. Secretary read notes by Mr. Wintle, on the fossils and other objects presented by him. The recent Pholas, with its perfect syphon, preserved in spirits, and the shell of another embedded in the clay rock, into which the animal had bored to a considerable depth, were examined with interest, as also were the large and small Gall Flies, which produce their characteristic growths on the leaves of the gum and other trees. As to one of the fossils (No. 10, *a*) a letter was read from Professor McCoy, to whom it had been sent by Mr. Wintle for examination, and by whom, as a new species, it had been named *Endogenophyllites Wellingtonensis.*

Mr. M. Allport called attention to the many interesting specimens presented by Mr. Wintle ; and mentioned in reference to the vegetable remains occurring in the clay rock, that similar impressions had been many years ago found by him (Mr. Allport) in vast numbers, in a quarry at the Old Beach, but from the coarser material, the difficulty of assigning to them their correct position amongst fossil flora was very great. Recently, Mr. Allport had found similar remains in a quarry near the Cascades, and that gentleman remarked that if a few more would interest themselves in a strict search, the probability was strong that remains of greater palæontological interest, and which would fix the geological age of the whole of these rocks, might be found. Referring to the wasp's nest presented by Mr. Wintle, Mr. Allport presented a similar nest with the wasp which constructed it, the wasp having been watched at work on the nest, caught and brought to the donor by a boy only five years old.

Mr. Barnard, in continuation of a former paper on the subject, read the following communication relative to the Esparto Grass, and laid on the table a sheet of Esparto paper :—"It may be in the recollection of the Fellows that, at the meeting of the Royal Society which was held on the evening of the 14th July last, on the occasion of submitting some observations on the desirability of acclimatizing the Esparto Grass for the manufacture of paper, with a view to the establishment of a paper mill in Tasmania, I was requested to prosecute the enquiry, and obtain further information on a subject considered of wide importance. Accordingly, by the July mail I gave effect to my promise of compliance with that request, by placing myself in communication with an eminent commercial firm in London, and soliciting their co-operation in the matter; and I will now lay before the Society the result of the correspondence up to the present date, regretting, while sanguine of the attainment of ultimate success, that more should not have by this time been accomplished. By return mail, under date 11th September, 1868, these gentlemen write:—'The short interval between the arrival and departure of the Marseilles Mail, has prevented our obtaining any useful information with regard to the Esparto Grass for the manufacture of paper; but you may rely upon our doing our best to assist you; and we will report, by next mail, the result of our inquiries.' Agreeably to this intimation, on the 9th October I was favoured with the following particulars:—'Esparto Grass.—We learn that 50,000 to 100,000 tons are imported here annually from Spain and the opposite coast of Africa. The last that was sold here fetched £4 15s. a ton, but scarcely any comes in here for sale. The bulk is bought by a company (in which Lloyd is the principal man) who have establishments in Spain, and own or charter ships for bringing in whole cargoes, and have a patent for dressing it here. It seems quite a monopoly, and other importers have discontinued. Under the circumstances, as you will conjecture, it is not easy to obtain information; but we have been able to get a sample of the last sold here, which we send you by this Mail. We are endeavouring to procure through some friends in Spain, a bushel of the seed. If we succeed, we will forward it to you; but it will be some time first.' By the last Mail, under date 31st December, 1868, the same gentlemen write:—'We have not succeeded in getting any further information about the Esparto grass; but we understand that another vegetable fibre—from Africa—is being tested by paper-makers, and promises good results. We will communicate any further information which we may obtain on the subject.' The sample of Esparto grass referred to has been laid upon the table, and the Society will please to receive the information embodied in the foregoing correspondence in the light of a progress report, to be followed up by further information from time to time as it may be transmitted. I present a sheet of paper manufactured from Esparto grass, for which I am indebted to the courtesy of Messrs. William Knight and Co., merchants of the New Wharf, which will enable the members to judge of its quality."

Mr. Justin Browne had seen it stated that this grass was driving rags out of the English market.

Mr. Napier observed that the profit from the grass must be enormous, as its price was but £4 16s. per ton, whilst the value of the paper produced from it was from £40 to £50 per ton.

Mr. F. Abbott read an interesting paper on the late transit of Mercury over the Sun's disc.

The Secretary in laying before the meeting two specimens of the dried mutton fish *(Haliotis sp.)*, prepared by the Chinese at South Port, read the following note from Mr. Justin Browne:—"I send you for exhibition at to-night's meeting some dried Mutton Fish. The shell of this fish is well known as the 'ear shell,' and when living the fish envelopes the shell or nearly covers it, and clings to the rocks with great tenacity. The Chinese pierce the shell with a sort of spear, and the fish being thus paralysed is easily detached from the rock; it is separated from the shell much as an oyster is, and is then dried in a slow oven built for the purpose, after which the dried fish are packed in casks or cases for export. Before cooking, it is soaked in water for a considerable time. Crayfish are treated in the same manner, and are cured in large quantities."

Mr. W. Knight, junr., exhibited a black powdery looking substance received from Mr Glover, who procured it on the West Coast. It occurs in considerable quantities along some of the freshwater creeks, and on some of the sea beaches and is carbonaceous in character—possibly the remains of firewood used by the Aborigines at their cooking places, where shell and other fish were consumed.

On the motion of Mr. Allport, seconded by Mr. Justin Browne, the thanks of the meeting were given to the authors of papers, and the donors of presentations, especially to Mr. Wintle, for his very interesting contribution.

APRIL, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th April, T. Giblin, Esq., in the chair.

The following returns for the past month were laid on the table:—

1. Visitors to Museum, 877.
2. Ditto to Gardens, 2,724.
3. Plants, &c., sent from Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from F. Abbott, Esq., Table and Summary for March.
2. Port Arthur, from J. Boyd, Esq., Tables for February and March.
3. Westbury, from F. Belstead, Esq., Table for March.
4. Brisbane, Queensland, from E. McDonnell, Esq., Meteorological Summary for February.
5. Lighthouses, &c., from the Hobart Town Marine Board, Monthly Tables for the half-year ended 31st December, 1868.

The presentations to the Museum and Library were as follows:—

1. From W. Johnstone, Esq., Trinity Hill, a Boomerang and Waddy from Queensland, a Spear from New Hebrides.
2. From H. M. Hull, Esq., a Key-hole Limpet, and Chiton, from Sandy Bay; a Magpie Perch.
3. From Mr. F. Holmes, portion of Skin of Whale, tanned.
4. From Mr. G. F. Gooch, a small Silver Coin.
5. From Mr. Mitchell, Sandy Bay, a Basket and Necklace made by Female Aborigines of Tasmania.
6. From Dr. Cox, Sydney, 67 specimens of Shells.
7. From Mr. Hannaford, an Ostracion and 2 seeds of the *Trappa bicornis*, from China.
8. From W. A. B. Gellibrand, Esq,, a Female Specimen of the Native Tiger *(Thylacinus cynocephalus)*.
9. From J. Maclanachan, Esq., a Hen Golden Pheasant.
10. From J. Swan, Esq., Skeletons of Forester and Brush Kangaroo, and 2 Bandicoots.
11. From Mrs. Room, Launceston, an Indian Silver Coin (½ rupee)
12. From Dr. W. Sonder, Hamburg, Flora Capensis, by Drs. Harvey and Sonder, 3 vols. bound cloth.
13. Tasmanian Industries, by J. E. Calder, Esq. (pamphlet), 2 copies, presented by Her Majesty's Government.
14. Statistics of New Zealand, 1867, presented by New Zealand Government.
15. From E. D. Harrop, Esq., Launceston, Four Mounted Specimens of Fluke *(Fasciola hepatica)*.
16. From Mrs. C. Meredith, Specimen of the Australian Coot (*Fulica Australis*).
17. From Mr. F. A. Moore, Mangalore Farm, Bridgewater, a Copy of *The Derwent Star and Van Diemen's Land Intelligencer*, April 3rd, 1810, containing an account of the death of Governor Collins. Printed Government Orders, January 14th, February 5th, March 2nd, April 5th, 6th, and 15th, 1814. A Promissory Note, value 3d., signed W. Robinson, 1824. [These records of the early days of the Colony excited much attention among the members present.]

The Secretary, Dr. Agnew, read a letter from Baron F. Von Mueller, intimating that a copy of a work entitled "Flora Capensis," by Drs. W. H. Harvey and O. W. Sonder, had been presented to the Society by the latter gentleman. (See presentation No. 12.) Dr. Sonder also took the opportunity of conveying his thanks for his election as a corresponding member of the Society.

Mr. M. Allport informed the meeting that he had this season successfully stripped and fecundated the ova from the indigenous grayling *(Prototroctes murœna)*. The male and fomale fish were taken with the rod at the Falls, New Norfolk, during the last week in March. The ova were brought to town and deposited in a slate tray with a gentle stream of water running through it. The embryos first showed in 3 days and hatched out in 8 to 12 days. Unfortunately the delicate little fish scarcely survived the extrusion from the egg more than a few minutes, and were all lost, probably from want of greater depth, or other physical condition of the water, of which we are at present ignorant. The main interest attaching to the experiment is, that it upsets the theory long held by many fishermen that these fish spawn in salt water.

The Secretary read a paper by Mr. E. D. Harrop, of the Bank of Van Diemen's Land, Launceston, on the fluke *(Fasciola hepatica)*. The subject was illustrated by several microscopical preparations (mounted by the author) of the Ova, Ovaries, &c., of the animal, which were examined with much interest by the Fellows present.

Discussion followed, and, after a well-merited compliment to Mr. Harrop, for the care and neatness displayed in the mounted specimens of fluke presented to the Society, Mr. M. Allport observed that Mr. Harrop regrets that he has been unable to prepare any specimens of the Cercariæ of Fasciola hepatica, thereby implying that he has found such Cercariæ; has he done so? and if so, where? Mr. Allport believed that reliable information as to the Cercariæ being found elsewhere than in sheep, would supply a link hitherto missing in the natural history of this fluke. Cobbold expressly states that the life of the liver fluke subsequent to the hatching of the ciliated embryo, and until its re-appearance in the liver of the sheep, is at present unknown, but, that analogy (based on the well-known history of other allied creatures) would lead to the conclusion that the embryo takes up its residence in a molluscan host, and forms sporocysts, the progeny from which ultimately get to the interior of the sheep. Mr. Allport admitted that the probabilities are strong that some other hosts than mammalia were concerned in the development of the liver fluke, but stating that to the best of his belief proof was yet wanting.

Mr. Walter Gellibrand mentioned an instance in which he had known sound ground on which a few fluky sheep were pieced for a few days, to transmit the disease to sound sheep in three weeks, in this case it seems hard to believe that any intermediate host was concerned in the development of the perfect fluke.

A vote of thanks to Mr. Harrop, and to the donors of presentations, closed the proceedings.

MAY, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th May, M. Allport, Esq., in the chair.

The following returns for the past month were laid on the table:—

1. Visitors to Museum, 781.
2. Ditto to Gardens, 1,567.
3. Plants, &c., received at gardens.
4. Ditto, sent from gardens.
5. Time of leafing, flowering, and fruiting of a few standard plants in gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for April.
2. Swansea, from Dr. Story, table for April.
3. Westbury, from F. Belstead, Esq., table for April.
4. Sydney, from G. R. Smalley, Esq., Government Observer, table for February.
5. New Zealand, from the Government Observer, tables for January and February.

The presentations were as follow;—

1. From Mrs. C. Meredith, a Coot (*Fulica Australis*).
2. From Hon. C. Meredith, Esq., two specimens of "Silver Fish" from Prosser's Bay.
3. A Kingfisher (*Alcyone azurea*) donor unknown.
4. From T. Stephens, Esq., a Kingfisher (*Halcyon sanctus*), from Southport.
5. From E. D. Swan, Esq., nest and eggs of *Epthianura albifrons*, found at Cornelian Bay.
6. From Dr. Storey, Swansea, skeletons of Eagle Hawk, Crane, Bandicoot, &c.
7. From Mr. A. J. Taylor, New Norfolk, a copper Coin of French Republic.
8. From Mr. Rollings, Sorell, a Jade Chisel from New Zealand. Flint Implement used by Tasmanian Aborigines for skinning Kangaroo, &c.
9. From M. Allport, Esq., Gelatinous tube of Salpa, and small Crustacean found within it. From Adventure Bay.
10. Ditto, found at sea on the voyage from England, presented by Miss S. P. Edwards.
11. From the Hon. R. Officer, Esq., M.H.A., a set of Maps of Geological Survey of Victoria, 1 vol. bound.

Mr. Stephens called attention to a specimen of Kingfisher (presentation No. 4), which he had brought from Recherche Bay, where it was shot by Mr. Collis, and remarked that it was not included by Gould among the birds of Tasmania.

Mr. Swan remarked that he had for some time been aware of the existence of a second species of Kingfisher in Tasmania, and on examining the bird referred to by Mr. Stephens, had no doubt as to its being a specimen of the sacred Halcyon (*Halcyon sanctus*), whose habitat had hitherto been supposed to be confined to the Australian Continent.

With regard to presentation No. 5 (Nest and Eggs of *Epthianura albifrons*) the same gentleman observed that it was interesting, as proving beyond a doubt that these birds breed in the colony, they having previously been looked upon as mere casual visitors.

Referring to the crustaceans presented (Nos. 9 and 10), Mr. M. Allport stated that his specimen was picked up alive on the beach at Adventure Bay. At first the animal kept itself so pertinaciously within the clear gelatinous cylinder (resembling in shape a small barrel with the ends knocked out), through which it could be distinctly seen moving about, that he took this cylinder to be a part of the animal, probably some extension of the carapace, analagous to that found in the entomostraca, but further observation showed that the enclosed crustacean was quite free of its beautiful envelope, and that it readily protruded its head and anterior limbs from either aperture. The envelope might be the empty case of one of the Salpæ, a family of floating molluscs, many genera of which are common round our coast, and the crustacean either took up its temporary residence in the already empty case or, as is most probable, had first devoured the softer parts of the mollusc and was on the look out for a second victim. Having preserved the specimen, Mr. Allport showed it some time after to a lady (Miss Edwards), who immediately recognised it as identical with one caught by her in a floating dredge on the voyage from England several years before, and which she had preserved. In order to demonstrate that the crustacean in the first specimen had not chosen its crystal-like home by mere chance, but as a part of the regular economy of this curious animal, Miss Edwards had kindly presented her duplicate specimen to the Museum.

Mr. Allport incidentally remarked that many of the Salpæ from the diaphanous nature of their outer covering, would form beautiful living objects for low powers at one of the Society's microscopic meetings.

Mr. Stephens, in bringing under special notice the fossils from Table Cape, collected and presented to the Society by Mr. Hainsworth, gave a lucid sketch of the geological formation of the portion of the northern seaboard of the island, extending from the Tamar to Circular Head. He then noticed in detail several of the specimens, and pointed out their value in a palæontological point of view. Mr. Stephens also referred to the great value which a more complete series would be to the Museum, and was sanguine that Mr. Hainsworth would still pursue his labours in the cause, and enrich the collection with specimens yet to be discovered.

Mr. M. Allport called attention to a branch of Gum (*Eucalyptus sp.*), kindly forwarded by Lady Dry, the leaves of which were coated with a purple powder, resolving itself, under the microscope, into myriads of eggs of some insect, now rapidly hatching, and probably belonging to the Aphides. Under the low powers of the instrument the brilliant colours of the egg-cases elicited much admiration.

The Chairman (Mr. Allport) after the proposal of the vote of thanks to the donors of presentations, and to Mr. Stephens, for his able remarks on the geology of the North Coast, called the attention of the meeting to one fact, that fixed the geological age of the raised beaches at Table Cape at about the same as the Travertine of Geilston Bay, though one was of marine, and the other of fresh-water origin, viz., the presence in each of bones of existing animals, as evinced by the Wallaby skeleton obtained from the coast formation by Mr. Wm. Archer, and the bones of the Dasyuri, Phalangistæ, and Permales, obtained by himself from Geilston.

After some conversational discussion, the thanks of the meeting were accorded to the donors of presentations, specially to Mr. Hainsworth for his valuable contribution, and to Mr. Stephens for his interesting address.

The meeting then terminated.

ON THE TRANSIT OF MERCURY OVER THE SUN'S DISC, NOV. 5TH, 1868.

By FRANCIS ABBOTT, F.R.A.S., &c.

I lay on the table a diagram in which is embodied the elements, and a full explanation, of the transit of Mercury, with the true path of the planet over the sun's disc on the 5th of November, 1868. The observations were made with a five foot equatorially mounted achromatic telescope. Other observations were also made at the time, and near the same place, with a small Gregorian reflector. The day was fine, and the passage of the planet over the sun's disc was observed as a well-defined round black spot. When the true limb of the planet reached the true limb of the sun, the light being cut off, a fine dark ligament appeared to connect the limb of the planet and the sun, showing the true time at first contact.

The Hobart Town time of transit was computed from the Nautical Almanac; the observations made with a half second chronometer, and when compared with the normal clock it was found to be remarkably close, I scarcely think one second in error.

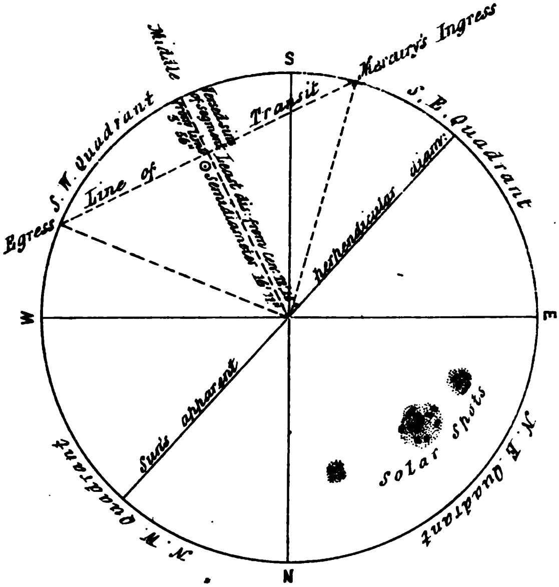
The sun's limb was well defined, and the tremor by no means considerable. Some measures were made of the difference of right ascension of the Sun and Planet, they have been corrected for refraction, and for the motion of the sun, and are compared with the elements given in the nautical almanac, as shown in the diagram. In the observation I saw neither central bright spot, halo, nor satellite. My attention was directed to time determinations for ascertaining longitude, rather than to any peculiarities that might be presented during the transit.

The Royal Astronomical Society are in full possession of all the means employed by Commander Kay for determining the geographical position of the Magnetic Observatory here, the whole series of observations consisted of moon culminating stars, of which 41 sets from both limbs of the moon were observed on the meridian, with an excellent transit instrument by Troughton and Simms. The solar eclipses, and the eclipses of Jupiter's satellites were observed with a telescope made for the purpose by Jones. When the distance of any two given places is not very great, the longitude is determined with accuracy by transmission of chronometers, for which purpose Captain Kay availed himself of the well known positions of the observatory at Parramatta and Fort Macquarie, Sydney Harbour; by this method no less than 76 chronometers were employed, independent of 110 astronomical observations, and a triangulation. The whole of these observations were made from the year 1843 to 1846, and in order to obtain the corresponding observations of the moon culminating stars, previous arrangements were made at Greenwich, Edinburgh, Cambridge and Oxford. The lunar observations were afterwards placed in the hands of Mr. Riddle, head Mathematical Master of the Nautical School at Greenwich, for reduction, and the whole series were reduced, and a paper drawn up from the results by Captain Shadwell, for the Astronomical Society, which gave for the longitude of Hobart Town, 9h. 49min. 29·6 secs.

Since the time this result was arrived at Captain Denham, when stationed at Garden Island, sent an officer into these waters for the purpose of confirming the longitude of Hobart Town. The mean result of all observations made at that time, gave for the longitude 9h. 49m. 28·8s. being a small difference of (0·8)—eight-tenths of a second. There remains, however, still much doubt as to the correct geographical position of any of the Australian colonies being correctly known. Captain Kay thinks with the Astronomer Royal, that for observing the forthcoming Transit of Venus, in December 1874 and 1882, they are not suited until better known. Mr Ellery thinks differently, he considers the longitude of th Melbourne Observatory as well known as that at the Cape o Good Hope. The Sydney Astronomers believe the longitude established at Fort Macquarie, Sydney Harbour, and at the Observatory, Parramatta, by the late Sir Thomas Brisbane, assisted by his computer and observer, Mr. Rurnker, and Mr. Dunlop, to be the best known of any in these colonies. The authorities for the establishment of the longitude of Fort Macquarie, Sydney Harbour, and the chronometrical differences of meridians employed in the determination of the longitude for Hobart Town, from them, were very numerous.

The determination of the latitude of any place is a much simpler problem; the latitude obtained by Captain Kay, was the result of sextant observations by the method of circum-meridional altitudes of the sun and stars. In their reduction, Baily's Tables and Formulæ of reduction to the meridian, and Ivory's Tables of refraction, with their correction for pressure and temperature were used. Captain Kay thinks that the latitude assigned to the observatory cannot be much in error. If we consider the number of observations made and the large amount of labour bestowed upon them, the authority co [illegible] and the result obtained, we have a [illegible] ht to [illegible] the geographical position of Hobar [illegible] of the Australian colonies. In all [illegible]

TRANSIT OF MERCURY
OVER THE SUN'S DISC
NOVEMBER 5TH 1868



HOBART TOWN TIME OF INGRESS. $\overset{h}{3}$. $\overset{m}{14}$. $\overset{s}{9}$ P.M.

" " " . EGRESS 6 . 52 . 27 "

del. F. Abbott

Survey Department, Hobart Town

ten principal observers engaged at the transit of Venus in 1769 had a fixed position more correct than that at Hobart Town.

The re-discussion of the transit of Venus in 1769 recently made by Mr. Stone, at the Greenwich observatory, from results of all observations made at the time, has reduced the sun's distance to near that arrived at by the opposition of Mars, and the speed of light, viz., 91,700,000 miles. This great problem therefore may be considered almost settled within the requirements of our present astronomy, and only waits for confirmation at the next transit of Venus to make all things accordant. This necessity is more felt owing to some doubt having arisen on a misinterpretation said to be made by Mr. Stone, in his re-discussion on Chappe's statement made at the time of contact of the sun and Planet, and the circumstance of Pauly having left his telescope before the last contact.

This question of the correct geographical position of these colonies therefore, is a problem that will require to be settled before the time arrives for ascertaining the true value of the solar paralax.

There is a great uncertainty of any expedition being able to reach either Wilks Land or Sabrina Land in the month of December. In all probability the Australian colonies will be made the southern limit of observation. If, therefore, some well-defined spot is fixed upon in the interim, and suitable means employed to establish it as a starting point for determining the correct geographical position of any other spot with equal accuracy, either by telegraphic communication or transmission of chronometers, several different stations could be either confirmed or corrected for the reception of any number of expeditions that might be sent to these colonies.

REMARKS ON THE FLUKE *(FASCIOLA HEPTICA).*

By E. D. Harrop, F.R.M.S.

Having lately had an opportunity of examining and dissecting specimens of Fluke, and in consequence having had to refer to some of the literature extant relating thereto, I venture to lay before your learned Society a few remarks, bearing more particularly on the generative organs, and reproduction of this parasite.

I beg to offer for examination by the Members, preparations as follows:—

Slide No. 1. *Fasciola hepatica,* taken from liver of sheep killed in the Midland District, showing oral and ventral suckers.

Slide No. 2. Portion of uterus, with eggs packed in situ.

Slide No. 3. Eggs of *Fasciola hepatica.*

Slide No. 4. Same; with operculum off, and vitelline contents extruded, also showing filamentoid spermatozoa.

These parasites are perfectly hermaphrodite. Their generative organs are well understood, and in proportion to the size of the animal, the extent and complication of these organs are astonishing. The male apparatus, the uterine cavity and oviduct, the yelk forming glands, occupy by far the greatest portion of the body.

Siebold says, "the female apparatus of the trematodes consists of a germ forming organ (ovary), with its excretory duct; then two others for forming the vitellus, which have also excretory ducts, and then a simple uterus with its vagina. The male apparatus consists of testicles with their excretory canals, an internal seminal vesicle, a cirrhus-sac, an external seminal vesicle, and a penis."

This simple and concise description fails to convey a sufficiently enlarged idea of the beautiful arrangement and extent of the organ devoted to reproduction in the species under consideration. The whole circumference of the body just beneath the skin is occupied by the ovaries, from these oviferous canals arise, and uniting on each side of the body, convey their contents into the large oviducts which terminate in the uterus. The male apparatus takes up the centre of the body. The testes, consisting of a great number of small and much convoluted vessels, terminate in two large tubes which convey the spermatic fluid to the vas deferens, which becoming attenuated, terminates at the root of the penis.

The uterus consists of a tortuous tube filled with eggs. A portion of the uterus is shown in preparation No. 2. The eggs are of a yellowish color, have an operculum, and are found in vast numbers in individual specimens of the entozoon. Slides Nos. 2 and 3 exhibit the eggs as taken from the uterine tube, and on slide No. 3, near some of the eggs, are to be seen some spermatic filaments.

Alternate generation is the term applied to the various transformations these entozoa undergo in the course of their full development. There is a missing link in some of the stages, but sufficient is known for a thorough comprehension of the subject. The eggs being formed by the elaborate and beautiful reproductive system above described, escape from the uterus one at a time, and when perfectly mature the operculum is pushed off by the energetic action of the ciliated embryos within. An examination of slide No. 3, will show embryos (unfortunately not sufficiently advanced to exhibit cilia) amongst the extruded vitellus. In some cases these embryos make their escape whilst the egg is within the uterus, but more frequently they escape whilst the egg lies on the marshy or moist pastures. According to Siebold the development of the egg is as follows :—" After the disappearance of the germinative vesicle, large transparent embryonic cells appear in the midst of the vitellus, which undergo fissuration. These multiply by division, increasing at the expense of the vitellus, which in the end they completely replace. When this has taken place there is a mass of extremely small cells, which being covered with a delicate epithelium having cilia, form a round or oval embryo." The ciliated embryo can progress in moist grass or water, and, sooner or later, attaches itself to the surface of the body of some mollusk, most commonly the limneus, planorbis, or paludina, when it loses its ciliated epithelium and gains access to the interior of its host. When there the germ bud contained in the embryo developes rapidly into a non-ciliated larva, within which another family is developed. The enlarged larva is now transformed into a cyst, and is then called a " nurse," and its contained family develope into cercariæ. These cercariæ have an independent life of their own, and it is not absolutely necessary to their existence that they should enter the viscera and liver of a vertebrate, but when there, they meet their highest form of development in the mature liver entozoon. I regret much that I have not been able to prepare specimens of the cercariæ, but when I do so I will forward some for inspection.

Let us recapitulate these powers of reproduction, commencing with the full-grown fluke :—In each individual a vast number of eggs are matured, and each one of these eggs contains a ciliated embryo, capable, after entering a molluscan host, of developing into a non-ciliated larva ; this larva undergoes further development, has a considerable progeny of its own, which escape and are known as cercariæ; here follows under certain conditions, a separate existence not fully traced out, but each cercariæ can enter the viscera of a vertebrate, when, in the liver, it attains its final development in the full grown and sexually mature fluke. Let preparation No. 2 (in which only a portion of the uterus is shown) be examined under the microscope, and the number, and dense packing of the eggs be observed, we shall then be astounded at the capabilities of increase made manifest, and no longer wonder at the rapid spread of this parasite.

From this knowledge of the reproduction of the fluke, we may fairly deduce the following conclusions:—

First. That the immediate progeny of the Fasciola is innocuous to vertebrates, for certain metamorphoses or alternations of generation must be passed through before it can develope into the mature animal.

Second. That the eggs (being provided with a hard shell) having passed out of the Fasciola, may be blown about the country and not develope until they meet with favorable conditions.

Third. That an estate may have the reputation of being perfectly free from fluke and yet the germs may be there in myriads, ready to develope when favourable conditions arise, may be through an overmoist season, may be through increase in molluscan life, may be through subtle influences not yet explored.

Fourth. That on a comparatively dry estate, having the marshes well drained, the disease will never be very serious, unless the seasons happen to be peculiarly mild and moist.

Fifth. That molluscan, or aquatic insect life is necessary to the development of the ciliated embryo, but it is not known how long this embryo can live without moisture; yet it has been proved that infusorial life generally will bear extreme dessication and yet survive.

Sixth. That the offspring of flukey sheep are not born diseased; but in consequence of the systems of the parents being disordered, the offspring may be more predisposed to attacks of the worm, than those born of healthy sheep.

It is stated in a report on fluke, which recently appeared in the newspapers, that "when once a sheep becomes the host of flukes it is doomed, as the parasite will continue in the liver ducts until the life of the animal be exhausted." This does not appear to be the fact, for I have it not only on the authority of Cobbold, that the entozoon after entering the liver ducts, passes into the biliary outlet, thence into the intestinal canal, and is so expelled; but also from the observation of practical flock owners, that when sheep not 'badly flukey' are brought into dry healthy pastures they get round again. And it is also known, that the eggs are not, in most cases, expelled from the uterus until the fluke has passed from its host. Now this knowledge, removes, in some measure, the gloom from the terrible picture of the disease and its results portrayed in the report. The conclusion is almost beyond controversy, namely, given healthy, well-drained pastures and the fluke will disappear in a great degree; although the germs of the disease will always be there ready to spread in any flocks that may be exposed to attack by being placed in conditions favorable to their development.

Good drainage and occasional salt diet appear to be the only remedies known at present; but it is quite possible that certain breeds or crosses may, from having more vigorous systems and better digestive powers, withstand the entrance of the parasite into the tissues better than others.

Perhaps, I may be pardoned if, before concluding, I pass from the scientific side of the subject to the consideration rapidly and curtly, of its politico-economic relations.

The disease and its causes has been well known for the last century. Its internal microscopic structure has certainly, only comparatively recently been elucidated, but all that which relates to its dire effects on sheep, that which tends to irritate or to subdue its prevalence, has been intimate knowledge for a long time. Turning to the first edition of Cuvier, published in 1817, I find, under Les Trematodes, the following:—

"La plus celebre est la douve due foie (*Fasciola hepatica*, Linn), qui est si commune dane les vaisseaux hépatiques des moutons, mais qui se trouve aussi dans ceux de beaucoup d'autres ruminans, du cochon, du cheval, et même de l'homme.

"La douve des moutons se multiplie beaucoup, quand ils paissent dans des terrains humides, et leur occasionne l'hydropisie et la mort."

It is very evident, then, that the disease and causes of its aggravation have been known amongst sheep farmers for a long time. A sheep farmer, understanding his business, must have known well enough that, in taking up his flocks to the marshy lands of the Lake district he was taking them to certain disease; and without the slightest precaution, bringing them down to winter in the warmer country below, was taking as certain means to spread that disease. It may be presumed that some sheep farmers desirous of larger gains, have carried more sheep than their cultivated estates would bear in summer, and that during those months they sent them to depasture on lands utterly unprepared by drainage for their reception. The result was inevitable; for a time greater profits accrued, but a swift and dire Nemesis overtook those who offended against experience and reason, unfortunately, in many cases, causing the innocent alike to suffer with the culpable. I should not have thought of making these remarks if it were not that it has been proposed to render Government assistance in draining and firing the lands of flockmasters. I venture the opinion, in all deference, that it would be highly improper to render any such aid. The spread of the disease, for the germs are everywhere, has been caused through the cupidity or ignorance of flockmasters. Is it right that the public should pay because they are now suffering the consequences? It is no new thing, no sudden and hitherto unknown visitation, but, on the contrary, we know well its cause, and, therefore, the means of its alleviation.. As soon would we think to live unsheltered in the fen country and escape ague, as to keep sheep on marshy grounds and expect them to escape the fluke.

It would be more in accordance with the dictates of political economy to let matters take their course until flockowners found it to be to their interest to study the sheep, its food, and requirements, with the same attention as they would any other animal from which profit is expected. There are times, perhaps, when for the general benefit, a government may resort to special measures, but in such case, whatever pecuniary outlay may be thought requisite should be met by a special tax on those who have caused the evil, either by their avarice, ignorance, or carelessness, and not on the public, who have obtained no benefits but rather absolute harm, the result of mismanaged property, which, although private, should not be used to the general disadvantage with impunity.

REMARKS ON THE GEOLOGICAL STRUCTURE OF PART OF THE NORTH COAST OF TASMANIA, WITH SPECIAL REFERENCE TO THE TERTIARY MARINE BEDS NEAR TABLE CAPE.

By T. Stephens, M.A.

The interesting collection of rocks and fossils recently presented to the Museum by Mr. Hainsworth, of Table Cape, calls for something more than a passing notice, and the occasion suggests a brief consideration of the succession of strata exhibited by the coast section from the Tamar to Circular Head.

Between the Tamar and Port Sorell, the Primary rocks are extensively developed. They consist chiefly of slates, schists, limestones, quartzite, and conglomerates, with a general strike to the N.N.W., and they are to be seen continually recurring with anticlinal and synclinal undulations along the whole line of coast from Badger Head almost to Cape Grim. So little is known of the palæontology of these rocks, that it is impossible to do more than hazard a conjecture as to their relative position or age; but they comprise representatives of rocks which show themselves near the Grampians in Western Victoria forming possibly the base of the Lower Silurian series or even of still older date, and they certainly range in an upward direction as high as Upper Silurian. Slight traces of gold have been found at various points, but there is a singular absence of the dykes and veins of true quartz, and other features which characterise the auriferous slates of similar age in other countries. Still, the absence of all trustworthy indications of the presence of gold in paying quantities has not deterred the "practical digger" from wasting his money and time in prospecting such localities as the head of Middle Arm on the Tamar, and even more unpromising spots. Very rich red and brown hæmatites, with other ores of iron, are met with at various points, and notably on the west bank of the Tamar, where they have been fully investigated and reported on by Mr. Gould. Thin veins of galena associated with sulphurets of copper and iron, and carbonates of copper, occur near the Leven, and though the surface indications in that particular locality are not encouraging, they may some day be found further inland developed in valuable lodes.

Resting unconformably on these Primary rocks and usually occupying the ancient valleys formed by their elevation are sandstones and shales containing thin seams of excellent coal. They are associated with calcareous beds containing *Spirifera*

Pachydomus and *Producta* in great abundance, with many other well-known Upper Palæozoic fossils. The resiniferous shale or dysodile of the Mersey, has also been proved by Mr. Gould to belong to this series. These coal measures have not yet been recognised as existing West of the Leven, having probably been removed by denudation. They may, however, be met with as the settlement of the land advances southwards from the coast.

The horizontally bedded conglomerates and breccias of very variable character and uncertain age which occur at intervals between Port Sorell and Table Cape appear to come next in geological order, but may belong to the last named series of rocks. They have occasionally been tilted and broken by intrusions of basalt, and perhaps of trap also, but this is less certain. They are chiefly composed of rolled pebbles and angular fragments of the Primary rocks and the plutonic rocks associated with them, and are usually held together by a strong silicious cement. At the mouth of the Inglis this formation is especially interesting. Large angular blocks of granite and porphyry, the former sometimes weighing several tons, together with rolled pebbles of many of the Primary rocks, are here seen embedded in a fine grained mudstone; this being evidently derived from the denudation of some of the softer slates, and deposited as mud on the margin or in the bed of some ancient river or estuary, which occupied a basin with nearly the same principal boundaries as the modern Inglis. These massive blocks of granite and other rocks which are not now found *in situ* within several miles of their present position, I consider to furnish more conclusive evidence of glacial agency in the geological history of Tasmania than I have met with elsewhere, and they strongly corroborate the testimony afforded by the seemingly erratic boulders which occur at various points in the basin of the South Esk. The age of this conglomerate is doubtful. It underlies unconformably the Tertiary freestone, which has been determined by Professor M'Coy to be of Miocene age, and it contains boulders derived from rocks which are certainly not older than the Lower Carboniferous or Devonian period. In the mudstone which forms the matrix of the transported boulders no fossils have yet been discovered, and the chance of finding them is occasionally lessened by the jointing and rude cleavage which sometimes traverses even the hard pebbles of chert, quartzite, &c., contained in it, and almost entirely destroys the traces of original bedding. It is right to mention that some detached portions of conglomerate, apparently belonging to the formation which I am now describing, have some of the peculiar characteristics of the conglomerate which belongs to the Primary series; but they cannot be separated from the more recent formation without stronger evidence than can be obtained by the passing traveller.

Among the rolled pebbles which line portions of the beach near Table Cape, and have been derived from the disintegration of the conglomerates now under consideration, there have been found from time to time fragments of a hard compact shale, varying in colour from dark brown to dull black, and so closely resembling the so-called "kerosene shale" of Hartley in New South Wales, both in appearance,and behaviour under the simple tests to which I have subjected it, that they may be considered identical. Two specimens exhibiting the chief varieties, have been forwarded by Mr. Hainsworth, who rightly estimates the important results that would follow from the discovery of the original home of this shale, and has already devoted much of his leisure time to the exploration of the surrounding country in search of it, though hitherto without success. The entire absence of all the members of the Carboniferous series from which these waifs might have been derived is an adverse circumstance, and the occurrence of a single specimen would have attracted no attention. But the great difference between this shale and all the varieties of Tertiary lignite, which are common enough in Tasmania, and the discovery at different points of several specimens all identical in character, force us to the conclusion that it is of pre-Tertiary age, and that portions of the series from which it has come, though removed by denudation near the coast line, will one day be found at no great distance inland. The extraordinary toughness of the shale is worth noting. It is easily seen that it would long resist the destructive agencies which have played so important a part in the geological history of this and other countries, and might remain unaltered long after the accompanying sandstones had been ground down and borne away to fill the hollows ot adjacent seas.*

I come now to the formation from which the interesting series of fossils now before us has been obtained. It varies in character from a breccia of coarse sand and broken shells to a fine-grained whitish sandstone, which has been used in

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* The subjoined report of an assay of this shale by Mr. Cosmo Newbery, of Victoria, has since been furnished by Mr. Hainsworth :—

KEROSENE MINERAL FROM NORTH COAST OF TASMANIA.

Burns freely with a yellow smoky flame, leaving a dark reddish brown ash. Contains iron pyrites. When heated in a closed vessel it melts, forming a fragile coke. A sample dried at 212° F. gives the following results :—

Water driven off at 230° F.	1.59
Volatile matter	67.36
Fixed Carbon	25.83
Ash	5.22
	100.00

the district for building purposes. It has been recognised at various points within a radius of five or six miles from the mouth of the river, and in some places shows a precipitous face of nearly 100 feet above high water mark. Although there is no section visible showing the actual contact between these beds and the basalt, which occupies a large extent of the adjacent country, there is no reason to doubt their priority to it; indeed, Mr. Hainsworth has informed me of an instance where basalt is found capping a small isolated hill which I know to have been formed by denudation, and which the basalt could only have reached by flowing in a lava-like sheet from a higher adjacent summit before the denudation had commenced. It is, however, quite possible that the fossiliferous strata represent two distinct periods, and that a portion of those which appear to abut against the basalt without the slightest alteration in character or position, may one day prove to be of more recent date.

The Museum already contains a series of these Tertiary fossils, presented by different donors, but it is surpassed both in extent and variety by the collection now before us. The specimens are for the most part tolerably perfect, but some of the more delicate shells were so injured by pressure upon the decomposing matrix in which they were embedded that they could not be cleaned for purposes of identification, and had to be preserved in their rough state. The collection contains upwards of sixty species of Mollusca, representing the following genera :—*Strombus*, *Typhis*, *Fasciolaria*, *Cancellaria*, *Cassis*, *Fusus*, *Ancillaria*, *Conus*, *Pleurotomaria*, *Voluta*, *Mitra*, *Cypræa*, *Trivia*, *Natica*, *Potamides*, *Turritella*, *Siliquaria*, *Littorina*, *Trochus*, *Dentalium*, *Terebratula*, *Waldheimia*, *Rhynchonella (?)*, *Ostrea*, *Pecten*, *Lima*, *Spondylus*, *Modiola*, *Arca*, *Limopsis*, *Cucullæa*, *Pectunculus*, *Trigonia*, *Chama*, *Cardium*, *Lucina*, *Cyprina*, *Cardita*, *Venus*, *Venerupis*, *Crassatella*, *Tellina*, *Pholadomya*, *Corbula*, with a few others which I have not been able to identify. The Echinida are represented by species of *Cidaris* and *Spatangus*, and there are also two or three species of corals.

Among the shells which are now extinct one of the most noticeable is "*Trigonia semiundulata*" (M'Coy). This shell has not been found elsewhere in Tasmania, but I have seen it in similar formations on the shores of Port Phillip. It is worthy of remark that the recent *Trigonia*, of which we have two representatives, has not been found at all in the Table Cape beds. There is also a good specimen of a *Cypræa*, which is found nowhere else in Tasmania, and seems to be intermediate between *C. eximia* and the recent *C. umbilicata*, both of which are here found as Tertiary fossils. The collection includes a species of *Terebratula*, a *Trochus*, and a small *Voluta*, which I have not seen before.

There is further evidence afforded by leaf impressions in the sandstone, and fragments of lignite, to connect these beds very closely in geological age with the extensive Tertiary formation in and around Launceston, and on both banks of the Tamar, which I have also ascertained to be anterior to the great outflow of basalt, which extends from near Kerry Lodge to Evandale and the North Esk. They are also thus allied to the freshwater limestone which was formerly quarried in the outskirts of Hobart Town, and that which is still worked on the opposite side of the Derwent. These were described by Strzelecki many years ago, as the highest formation in geological sequence in Tasmania, and his description still holds good, the post-tertiary and alluvial deposits which are common in the basins of modern rivers, and on the existing coast-line, being of course excepted.

The igneous rocks of Table Cape, specimens of which have also been presented by Mr. Hainsworth, are exceedingly interesting, but can only receive a passing notice here. They present every variety from pumice-like scoriæ to fine-grained crystalline diorite, but may be classed under two distinct heads,—basalt and trap. The age of the latter and its exact relations to the sedimentary rocks it is not easy to fix, but a reference to a geological chart of the locality, prepared nearly ten years ago, when I was accidentally detained for two days in the neighbourhood, confirms the theory which I have latterly held of its being more recent than the conglomerate last described. It forms the projecting headland of Table Cape, and rises with a nearly vertical seaward face to a height of 583 feet. It is undoubtedly older than the Tertiary strata, and probably afforded a shelter under the lee of which they were quietly deposited during a long series of years; where, too, they rested undisturbed until the period of the tremendous eruption of basalt, which, breaking through the previously weakened crust at many points simultaneously, elevated a great portion of the land to its present level, and may be said to have closed the geological history of the North Coast.

METEOROLOGICAL AND BOTANICAL ABSTRACT FOR THE AUTUMN QUARTER, 1869.

OBSERVATORY, HOBART TOWN.

Months.	Mean in Shade.		Max. and Min. in Shade		Mean Solar Intensity Black Bulb Insolated.	Mean Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure. — Barometer corrected to 32°.	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Total Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
March ..	29·916	59·65	72·5	48·5	103·16	46·98	N.W., S.E.	41·10	9	1·58	3·75
April ..	30·019	56·46	66·0	47·0	88·93	45·33	N.W., S.E.	40·95	2	0·50	1.76
May ..	29·983	49·94	58·0	43·0	75·37	40·44	N.W., S.E.	9·36	14	3·07	1·11
Mean..	29·972	55·35	65·5	46·1	89·15	44·25	N.W. S.E.	30·47	25	5·15	6·62

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Autumn Quarter 1869.

March 12.—Tips of Hornbean commencing to turn yellow.
„ 12.—Coe's Golden Drop Plum ripe.
„ 15.—Seckle Pear commencing to ripen.
„ 17.—Tips of Elm commencing to turn yellow.
„ 22.—Horsechestnut leaves turning brown.
„ 26.—Ash leaves commencing to fall.
„ 28.—Oak ditto.
April 8.—Coe's Late Red Plum commencing to ripen
„ 10.—Chinese Chrysanthemum commencing to flower.
„ 14.—Elm leaves commencing to fall.
„ 22.—Mountain Ash leaves ditto.
„ 28.—Black Mulberry ditto
„ 30.—Seeds of Hornbean ripe.
May 8.—First Medlar ripe.
„ 18.—Coronilla glauca commencing to flower.
„ 20.—Photinia serrulata ditto.
„ 24.—Diosma alba ditto.
„ 25.—Spiræa prunifolia flora pl. ditto
„ 26.—Ailanthus gladulosus leaves all shed.

NOTE.—The Hornbeam was three, Coe's Golden Drop Plum twelve, Horsechestnut three, Oak two, Mulberry two, Medlar two, and Photinia ten days earlier this year than last. Coe's Late Red Plum was seven, Elm two, and Ailanthus two days later. The time of the remainder was the same as last year.

ROYAL SOCIETY.

JUNE, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, 8th June ; T. Giblin, Esq., in the chair.

Mrs. R. Walker, who had been previously nominated by the Council, was, after a ballot, declared duly elected as a member of the Society.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz.,—

1. Visitors to Museum, 596.
2. Ditto to Gardens, 1009.
3. Plants. &c., sent from Gardens.
4. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for May.
2. Port Arthur, from J. Boyd, Esq., table for April.
3. Swansea, from Dr. Story, tables for March and April.
4. Melbourne, from R. L. Ellery, Esq., table for April.
5. New Zealand, from the Government, tables for March.
6. Brisbane, from Queensland Government, tables for March and April.
7. Sydney, from G. R. Smalley, Esq., tables for February and March.
8. Westbury, from C. Belstead, Esq., table for May.

Also the following reports from the Government of Victoria :—

1. Report of Mining Surveyors and Registrars, Victoria, for quarter ending 31st March, 1869.
2. Report of Registrar-General, Melbourne (Vital Statistics), for quarters ending 31st December, 1868, and 31st March, 1869.

Registration of imported live stock for same period.

The presentations were as follows :—

1. From J. Hull, Esq. A Falcon *(Falco melanogenys)*.
2. From J. Maclaine, Esq., Clarke's Island, *per* Mr. M. Allport. An Avocet *(Recurvirostris rubricollis)*.
3. From Mr. R. Ransome, Southport, *per* T. Stephens, Esq. A specimen of Felspar Porphyry, and the Ear-bone of a Whale.
4. From the Seymour Coal Company. Slab of Shale with numerous plant impressions, from Seymour Mines. A specimen of Coal from West Wanganui Inlet, New Zealand.
5. From Mrs. Stagg. Eight Limestone Fossils (Tasmanian).
6. From P. Ferguson, Esq,, of the *Ceylon Observer*, *per* Mr. Langley, A Letter of the Chetty Merchants (Tamils) of Southern India and Ceylon, with an explanatory note.
7. From Mrs. Ransly. A Lizard with double tail.
8. From Mr. S. H. Wintle. Seventeen named specimens of Tasmanian Coleoptera, with note.
9. From J. Maclanachan, Esq. A Pheasant (a cross between English and Chinese breeds).
10. From R. L. Holmes, Esq. Transactions and Proceedings of New Zealand Institute, vol. 1.
11. From W. A. B. Gellibrand, Esq. Seventy-nine Photographs of Machinery in the Leeds Exhibition.

[These Photographs were presented to the donor by H. Denny, Esq., Secretary of the Leeds Literary and Philosophical Institution.]

Mr. M. Allport wished to take the present opportunity of remarking that he had recently seen in the *Student*, for December, 1868, a paper on the Salpæ, which confirmed him in the opinion he had hazarded at the last meeting in reference to the occurrence of a small Crustacean in the empty case of one of these animals.

Mr. Barnard laid upon the table a small specimen of fine crystal Sugar, manufactured from Beet-root, which had been taken from a sample of 28 lbs. exhibited at the late Agricultural Show held in Sydney, and read a paper upon the subject.

The Chairman remarked that he thought the thanks of the society were justly due to Mr. Barnard for bringing the matter before the meeting. He was certain it would be of great importance to the colony if the manufacture of beet sugar could be introduced, although at first perhaps only on a small scale, and by private individuals with simple apparatus, as described in the paper just read. In former years he had considerable experience in the growth of beet root, and was satisfied that this climate was peculiarly favorable for it. He could not indeed imagine why it was not more extensively cultivated, as it was a hardy plant, easily managed, and superior in almost every respect as a nutritive root crop to the mangold wurtzel. The produce of the two he thought would be about equal in weight, as the beet could be planted much closer than the mangold.

Mr. Morton Allport moved a vote of thanks to Mr. Barnard for his interesting paper, expressing his opinion that it was a pity gentlemen who had left the colony, and who had an opportunity of observing what was doing in other colonies, did not take some interest in the matter, as Mr. Barnard was doing, and forward reliable information upon the subject. There could be no doubt it would be to the advantage of the colony.

In reference to the subject, Mr. Napier recollected that some time ago a quantity of sugar from Sydney was placed in this market, but as it was somewhat peculiar in appearance, it did not command a ready sale; when tried, however, it was found to be so excellent for jams and general household use that it was all quickly bought up. Subsequently it was found that the sugar originally came from France, and was made from the beet root. He had great pleasure in seconding Mr. Allport's motion.

Mr. Davies was sorry more attention was not paid to the manufacture of sugar. It only required a little energy. If it could not be undertaken in the large and profitable manner recommended in the pamphlet issued by Government, it ought at least to be tried by means of the simple and inexpensive process seen by Mr. Barnard in action near Sydney. If this was seen to succeed in a single instance, no doubt many would engage in the process, and in time it might become a matter of considerable national importance.

Mr. Troup (D.A.C.G.), had seen the beet sugar largely produced in Germany, but doubted if in this island it could be manufactured to compete with sea-borne sugar, which was brought so cheaply to our doors. In America the Maple sugar could only be made profitably in the inland region, far from sea carriage. In the event of its being tried, however, he would recommend that the greatest possible care should be taken to procure the best seed, as it was found that the quantity of sugar in the beet varied very greatly according to the sample of seed.

The Secretary remarked that the important point to be determined was the price per pound at which the sugar could be produced by the simple process just described, and suggested that Mr. Barnard would be kind enough to procure from his friend precise information on this point. In reference to the value of beet sugar, in comparison with that of the imported, it was to be recollected that the refuse from the manufacture formed excellent food for cattle, &c., and being always saleable would be a set off in favor of the farmer.

Mr. Barnard expressed his great willingness to obtain the required information, if possible in time to lay before the next meeting.

Further discussion ensuing, the general feeling of the Fellows present appeared to be if the manufacture of the sugar could once be instituted, that the example would generally be followed. In order to promote this object, it was resolved that the Society should suggest to Government the propriety of offering a bonus for the first sample of a certain quantity, say 56lbs., of sugar produced in Tasmania from the beet.

As it was understood that some plants could be obtained from Mr. R. Walker, it was suggested that the experiment might be tried on a small scale at the Society's Gardens, if the very inadequate amount of labour available there would admit of it.

The Secretary having promised to see the Superintendent of the Gardens on the subject, the vote of thanks to Mr. Barnard, and to the donors of presentations, was accorded, and the meeting terminated.

JULY, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 13th July; J. Barnard, Esq., in the chair.

L. R. Castray, Esq., A.C.G., and G. Mace, Esq., who had previously been put in nomination, were, after a ballot, declared duly elected as Fellows of the Society.

The Secretary, Dr. Agnew, laid on the table the usual monthly returns, viz.,—

1. Visitors to Museum, June, 1832.
2. Visitors to Gardens, June, 803.
3. Plants, &c., received at Gardens. From A. Verschaffelt, Ghent, Belgium, 106 varieties of fruit trees, of which 48 arrived alive, 15 doubtful, and 43 dead. From Mr. G. Brunning, St. Kilda, 60 plants. From Mr. J. Harris, South Yarra, 47 plants. From Melbourne Botanic Gardens, 29 plants.
4. Plants supplied from Gardens. To Mr. Brunning, 54 plants, 12 packets seeds.
5. For Burial Ground, Cascade Invalid Depot, 40 cypress plants.
6. Time of leafing, flowering, and fruiting, of a few standard plants in Botanic Gardens.
7. Books and Periodicals received.
8. Presentations to Museum.

Meteorological Returns—

1. Hobart Town, from F. Abbott, Esq., table and summary for June.
2. Port Arthur, from J. Boyd, Esq., table for June.
3. Swansea, from Dr. Story, table for May.
4. Westbury, from F. Belstead, Esq., table for June.
5. Melbourne, from R. J. Ellery, Esq., table for May.
6. Sydney, from G. R. Smalley, Esq., table for April.
7. New Zealand, from Dr. Hector, ditto ditto, and report on meteorology for 1868.
8. Brisbane, from E. MacDonnell, Esq., table for May.

The Secretary read a letter of thanks from Professor Newton, of Magdalen College, Cambridge, for specimens of natural history, and publications forwarded by the Society in December last to the Museum and Library of that institution.

Also one from the Secretary of the Anthropological Society of London for a complete set of the transactions of this Society, presented by order of the Council.

The presentations were as follows:—

1. From Dr. Bennett, a crab, from Sandy Bay.
2. From Mr. J. Young, Howrah, eight specimens of Crustaceans (four Crabs and four Prawns), from Kangaroo Point.

[These Prawns have lately been taken in considerable numbers from the mouths of rock cod *(Gadus sp.)* caught in the Derwent, and it is somewhat remarkable that they have not hitherto been found in any other situation.]

3. From Mr. J. Townsend, specimens of Calcareous incrustation round roots of trees, from Sandy Beach at Pittwater.
4. From Mr. W. Johnston, a large seed of tree said to have been taken from the stomach of a Barracouta. Four Coins and one Brass Token.
5. From Mr. Whitely. Silver Coin, value 10 cents, Netherlands, 1849.
6. From Mr. S. H. Wintle. Specimen of Cleithelepis, from New South Wales, discovered by the Rev. W. B. Clarke. A Mineral specimen from a vein in the Mudstone, Huon Road.
7. From Mr. H. Hull. A Malay Kris.

8. From L. R. Castray, Esq., A.C.G. A letter written in the New Zealand language, with translation. [This letter, addressed by one native to another, was picked up near Taranaki.]

Six specimens of Woods from Madagascar, with Botanical, French, and Native names attached.

The attention of the meeting was directed to presentations of books to the table, from the Royal Geographical Society, Royal Asiatic Society, Linnean Society, Geological Society, Zoological Society of London, and Royal Institution of Great Britain.

Mr. Barnard read a paper on the Esparto grass, supplementary to his former observations on the same. From information referred to in the paper, it was evident that the cultivation of the grass could not be attempted in the colony with any chance of success.

After some discussion of a conversational character, votes of thanks were accorded to Mr. Barnard, and the donors of presentations, and the meeting terminated.

AUGUST, 1869.

The usual evening meeting of Fellows was held on Tuesday, 10th August, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the usual returns for the past month, viz. :—

1. **Visitors to Museum, 707.**
2. **Ditto to Gardens, 1251.**
3. **Plants and seeds sent from, and received at, Gardens.**
4. **Times of leafling, flowering, and fruiting of a few standard plants in Botanic Gardens.**
5. **Books and Periodicals received.**
6. **Presentations to Museum and Library.**

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for July.
2. Westbury, from F. Belstead, Esq., table for July.
3. Port Arthur, from J. Boyd, Esq., table for July.
4. Melbourne, from R. J. Ellery, Esq., table for June.
5. Sydney, from G R. Smalley, Esq., table for May.
6. New Zealand, from Dr. Hector, table for May.
7. Perth, Western Australia, from W. H. Knight, Esq., table for June.

The presentations were as follows:—

1. From F. Aubin, Esq., a Sun Fish (*Orthagoriscus sp.*), washed on shore at Spring Bay.
2. From Mr. W. J. Thomas, a large specimen of "Native Bread" (*Mylitta Australis*) ploughed up at Bellerive. [This specimen weighed 21lb. 10oz.]
3. From Mr. J Rossitor, specimens of the Maori Hen of New Zealand. An English Partridge. Three Bones of Foot of Moa (*Dinornis sp.*)
4. From Mr. H. Hull, three Small Fish from Derwent.
5. From H. Bilton, Esq., Glenorchy, double Head of Calf. [This specimen has two perfect mouths, and four eyes, but only one pair of ears. The Calf from which it was taken lived three days, and the cow which produced it had one on a former occasion with three legs.]
6. From Dr. Cox, of Sydney, a large number of Shells.
7. From Mr. J. Jones, a small Turtle from Lady Elliott's Island.
8. From J. Barnard, Esq., a package of Seed of Sugar-beet for distribution.
9. From the Institution of Engineers in England, a complete Set of the Transactions of the Institution, in eleven volumes.
10. Specimens of new species of Helix (*Helix Allporti.* Cox.)
11. From Mr. Roblin, a Black Cockatoo (*Calyptorhynchus xanthonotus*).
12. From Mr. Gates, Jerusalem, ditto.
13. From Miss S. A. Manley, four specimens of *Chamostrea,* from Carlton Beach.
14. From Miss S. P. Edwards, eleven copper Coins and Tokens.
15. From J. A. Youl, Seventh Annual Report of Inspectors of Salmon Fisheries, England and Wales.
16. From Rev. R. E. Dear, specimens of laminated quartz and iron ore, a number of flint implements of the Aborigines, collected by Mr. Rollings, of Forcett.
17. From J. Barnard, Esq., specimens Cinnabar Ore, from the Cudgegong, New South Wales.

The Secretary announced that it had been decided by the Council to hold the annual microscopical meeting on Tuesday, the 16th November, when it was hoped that every Fellow possessing an instrument would take part in the exhibition; and, in the meantime, endeavour to procure new and suitable objects, so as to render the meeting as attractive as possible.

Mr. Barnard read some notes on the cultivation of the Sugar Beet, supplementary to a former communication on the same same subject, and took the opportunity of presenting a package of the seed for distribution ; also, a small tract on " The Sugar Beet, its importance, cultivation, and management," by Jules Joubert, Secretary to the Agricultural Society of New South Wales.

Mr. Davies suggested that a portion of the seed should be sent to Dr. Coverdale, who he believed was now giving the growth of Beet a fair trial on the farm of the Queen's Orphan Asylum. As Dr. Coverdale was now making use of seed sent from Europe by Mr. John Walker, he would thus be enabled to institute a comparison between the seeds.

Mr. Morton Allport called the attention of the Fellows to an interesting scientific fact, connected with the Salmon experiment, viz., that the few pairs of Salmon trout (*Salmo trutta*) which were retained in a freshwater pond, purposely prepared for them, had deposited spawn in which the embryo fish were now distinctly visible. The parent fish were hatched in May, 1866, and are therefore nearly four years old, their weights varying from three-quarters of a pound to one pound and a half.

Mr. Stephens, in bringing under the notice of the Fellows an apparatus for applying sulphur to plants, by means of a common pair of bellows, in a thorough and economical manner, observed that the use of sulphur was now largely adopted in Madeira, where it had quite cured the disease in the vine *(Oidium)* which had been so destructive of late years. Sulphur thus applied would in fact destroy all vegetable blight, which was of a fungoid character (as was the case with the *Oidium*), and would no doubt be efficacious against the fire blight, which for some years had been so prevalent among the apple trees. [The instrument, which is very simple in construction, and could readily be made by any tin-smith, will be exhibited for some time in the Museum.]

Mr. F. Abbott read a paper on Nobert's test lines, Moller's Diatom Type Slide, and recent improvements in the construction of Microscopes; which was listened to with much attention. Mr. Abbott intimated that he intended exhibiting some new Micrometers, and other novel objects of interest on the evening of the Microscopical meeting.

Mr. Davies thought the thanks of the Society were specially due to Mr. Barnard, for the manner in which he had, on more than one occasion, brought the subject of Sugar Beet cultivation under notice, and begged to move accordingly.

Mr. Buckland seconded the motion, which was carried, and the usual vote of thanks having been given to Mr. Abbott, for his interesting paper, and to the donors of presentations, the meeting broke up.

THE MANUFACTURE OF BEET SUGAR IN NEW SOUTH WALES.

BY JAMES BARNARD.

During my recent visit to New Sonth Wales I bore in mind my connection with the Royal Society of Tasmania, with a view, if possible, to be useful to its interests upon my return, by bringing under notice any important facts that seemed to me to claim its attention.

Accordingly, I lay upon the table a Catalogue of the Intercolonial Exhibition for 1869 of the Agricultural Society of New South Wales, representing the efforts of industry in the various departments of science and art, in addition to the more immediate results of the Society in the application of skill, energy, and capital, to pastoral and farming pursuits. The exhibits were 1708 in number, and none to my mind possessed more attraction than the sample of sugar, 28lbs. weight, manufactured from beet at Summer Hill, near Bathurst. I was courteously favoured with a specimen, which I placed in a phial; and although from the extreme smallness of the quantity it is scarcely worthy of presentation to the Society, still I thought, as coming from the first exhibition of the kind in New South Wales, and as a means of identity to those unacquainted with its quality, it might not prove altogether unacceptable.

Other considerations contributed to fix my interest upon this subject. One was, that the advantages of the growth and manufacture of beet root sugar in Tasmania had been recognised both by the Legislature and the Government, and had led to the wide circulation of a valuable pamphlet throughout the colony in recommendation of this industry.

Another circumstance was, that while staying up in the interior I met a gentleman, possessing a large establishment, who informed me that he grew the beet and manufactured sugar sufficient for his own domestic consumption; and he described to me his *modus operandi* pretty well in the following terms, viz :—

"Sow the beet in soil of medium quality; transplant in rows eighteen inches apart, and twelve inches distant; wash the beet carefully, scraping off all dirt, and remove the heads. Cut up, and press out juice thoroughly, which boil in a copper; then add lime, dredged in until all acidity is removed, as per test paper. Continue to boil until it draws out to a thread; then stop. Take a beurette or funnel to a pin's head point, with a false bottom, perforated. Then place animal charcoal (shin bone of beef) on the false bottom or shelf within the beurette, and pour the syrup over the charcoal, which is to be beaten up fine, letting it drain through the funnel-head, this will be molasses, the grains of sugar being left on the surface of the charcoal, which scrape off. Then, to dry the sugar, put it into a pan, and place in "water-jacket"; *i.e.*, a square iron box, double, a space of two inches for water on each of three sides; the fourth is the door to one shelf in the middle, and the bottom forming another, on which shelves the sugar is placed, being completed by a closed door. Make a fire of vegetable charcoal on bed of sand, placing in the hot water. Place the "water-jacket" upon it until the sugar is dried. There is a valve on the top for escape of moisture. The object is equal temperature. Thus, sand, charcoal, water, shelves, sugar."

It had been my first intention to try this experiment myself on a small scale before submitting any communication to the Royal Society; but deferring to the suggestion made to me at a meeting of the Council this afternoon, I at once lay the process before the Society for trial, to enable any one willing to test it.

I will only add, in conclusion, that the Agricultural Society of New South Wales has a periodical for the publication of its transactions and correspondence; and that I had the pleasure, through a gentleman, of establishing relations between that Society and the Royal Society of Tasmania in the exchange of its papers. The first supply will, I expect, arrive by the next steamer from Sydney.

THE GROWTH OF BEET-ROOT AND MANUFACTURE OF SUGAR.

By James Barnard.

Acting upon the desire expressed by the Royal Society, on the occasion of my reading a short paper on the manufacture of beet-root sugar, I have been in communication with a gentleman in New South Wales with a view to procure further information, and have now the honour to submit the results.

Accordingly, I have the pleasure to place at the disposal of the Royal Society a small bag of the seed of the Sugar Beet, of the variety known as the White Silesian, and considered to be the best, which I have procured from Sydney; and although the quantity is small, being only enough to sow an acre and a-half of land, it may prove sufficient for the purpose of experiment. Distribution of this seed should, I suggest, be made, as far as it goes, to such persons as take an interest in the subject, and who would engage to sow a patch of ground and register the results.

Very valuable information is contained in a short elementary treatise, on the importance, cultivation, and management of the Sugar Beet, of which I present to the Society two copies that I received from Sydney, and suggest the desirability of its being republished in its transactions *in extenso.*

An article in the accompanying Bathurst *Free Press* will also be found not without interest, as announcing the intention of a gentleman in that district, Mr. J. F. Clements, the successful exhibitor of a sample of the beet sugar at the recent Intercolonial Exhibition in Sydney, to devote his best energies in the prosecution of this most important industry; and I am informed that Mr. Clements has obtained the services of an experienced practical man, in order to put the matter thoroughly to the test.

Connected with these efforts, I have it on the authority of the Secretary of the Agricultural Society of New South Wales, that it is Mr. Clements' intention to publish the full results of his operations in the journal of that Society, which will consequently be available to our agriculturalists in due course, as that publication is now regularly placed upon the table of the Royal Society.

Among the implements and machinery shown at the exhibition before alluded to, in class 201, was exhibit 871 a., Youngman's Patent American Sugar Evaporator and Refiner. The price was £47 10s., and the exhibitor was Mr. Robinson, of George-street, Sydney. It is described as "consisting of defecating, evaporating, finishing pans, and filters, with furnace, registers, dampers, and chambers, which enable the whole operation, from the strained neutralised juice to the refined syrup, (in which state it is the best possible for granulation), to be carried out in one continuous operation, with a capacity of from 8 to 10 gallons per hour, and with a consumption of fuel exceedingly small."

It must be a source of satisfaction to learn that Dr. Coverdale, the Principal of the Queen's Asylum, has determined to initiate the cultivation of the sugar beet, and its subsequent manufacture, at the New Town Farm; and no better employment could be given to the band of juvenile workers placed under that gentleman's control.

The same enlightened views which led to the circulation in the community of an abridgment of Baruchson's instructive pamphlet, will, doubtless, influence the Government to give encouragement to the proposed experiment, and sanction the purchase of the requisite machinery, to be obtained at such moderate cost, for the different processes of the manufacture.

A few figures here may serve to show the national importance of this useful industry. It appears, then, from *Nowell's Statistics of Tasmania for* 1868, that the annual consumption of sugar in this community averages about 70lbs. per head of the entire population. This makes a total of say 7,000,000lbs., or 3500 tons yearly, and exceeds in value £100,000 sterling. Hence it is apparent that there is ample scope for the most extensive operations, and that no apprehension need be entertained of over-producing this article of prime necessity.

Adverting now to the specific question of cost, which was put to me in reference to the adoption of this as a domestic manufacture upon a limited scale, I have not been able to procure data to show this with sufficient precision; and I apprehend that, after all, it could only be arrived at approximately, as it would evidently vary in almost every family, according to the degree of skill and experience brought to bear in the culture of the root, and its subsequent manipulation.

Comparison with the home manufacture of bread and beer, as well as with the products of the dairy, best illustrates, I think, the question—"Will it pay?" Many people, we know, bake their own bread, and brew their own beer, as well as make their own butter and cheese, irrespective altogether of the mere question of cost, but simply because it suits them to do so, either from living at an inconvenient distance from the usual distributors of these necessaries of life, or from the possession of the requisite means and appliances, or for other reasons. So, with regard to sugar, it might fall in with family arrangements, in some instances, to apply any available domestic strength to the prosecution of this valuable industry.

Taking up the inquiry, however, upon broader grounds, it may suffice to point out the fact that the beet-root contributes more than one fourth of all the sugar now used in the world, having in many European markets nearly supplanted the sugar-cane, as affording convincing proof of its being a paying industry. Hence, the conditions of success being the same, there can be no reason to doubt that, once introduced into these colonies, the extraction of sugar from beet would soon grow into a staple manufacture of the first magnitude. Much, of course, would depend upon the Legislature, in the recognition of its national importance by sanctioning only such fiscal measures in relation to the undertaking as should have the effect of imparting a direct stimulus and encouragement to this most important manufacture.

NOBERT'S TEST PLATE, MOLLER'S DIATOM TYPE SLIDE, AND MODERN MICROSCOPES.

BY FRANCIS ABBOTT, F.R.A.S., F.R.M.S.

Nobert's Test Plate, as an instrument for trial, is admirably adapted for comparing the quality of object-glasses, supplied by different makers,and every microscopist who possesses a first-class instrument naturally desires to know what it is capable of doing; for when the power and quality of his lenses are known to him, he is convinced it would be only a waste of time to try them further.

One of the most important tests that the properties of a microscope can be tried by is to clearly "resolve" the very fine lines of the frustules of the *Diatomaceæ.* The value of minute *Diatomaceæ,* is, in their surface markings, which are admirable test objects for the higher power of the microscope. This test was first made known by Messrs. Harrison and Sollitt, of Hull, but unfortunately as a standard measure, a great difference exists in the fineness of the markings in specimens of the same species obtained from different localities. In the *Amphipleura-pellucida,* the number of *striæ* range as low as 34, and many specimens present 60, 70, and 80 in 1·1000 of an inch. *Naviculæ-rhomboides,* range between 30 and 50 in 1·1000 of an inch, so that some specimens may be resolved with a 1-5th, a 1-4th, a 4-10th, or even a half-inch objective, while others require a 1-8th, or a 1-10th, or even a higher power. The first of the *Diatomaceæ* on which the lines were seen, was the *N. Hippocampus,* of Ehrenberg, by Pritchard and Queckett, in the year 1841. In 1844, Mr. Sollitt was in London, and showed the lines on the *N. liniata,* of Harrison, to the late Mr. Ross, with a 1-8th of Nachett's; at that time Mr. Ross could not bring them out with a very fine 1-12th he had just finished. This same Diatom *N. liniata,* has an average of about 60,000 *striæ* to the inch, which can now be well seen with a good $\frac{1}{4}$-inch objective.

For the purpose of testing this resolving power of microscopes, F. A. Nobert, of Pomerania, has adopted a method only known to himself, of ruling lines to a known scale of exceeding fineness, so close that physicists have declared it impossible they ever can be seen, and all trials hitherto have resulted in failures to resolve the finer lines of these plates.

Nobert's test is a series of groups of fine lines ruled parallel on thin glass, such as used for covering, and will admit of the focusing of high powers when reversed and secured on the glass slide; different plates contain a different number of groups, ruled to different scales, some have 30 bands or groups, the coarsest having its lines 1-1000th of a Paris line apart, and the finest being 1-8000th—each group or band being about 1-2000th of an English inch in width, and the whole 30 occupying a space perhaps a little more than 1-50th of an inch.

The plates now most in use have 19 bands, the first or coarsest being ruled to 1-11,240th of an English inch, and the finest to 1-112,668th of an inch. It is a difficult matter for the mind to appreciate such minute divisions, yet it is essential it should conceive them to prepare it for estimating the difficulty of seeing and counting such lines.

Is it possible for human art ever to make an instrument capable of rendering lines 112,668 to an inch visible. Is there anything in the laws of light which renders it impossible to see lines so close, and is it therefore uselesss for the optician to attempt to improve the microscope beyond a certain point? Or, for the naturalist to try any further investigations on the structure of tissues beyond what the present existing instruments have shown. This problem is the exact parallel of that in testing the quality of the telescope for separating double stars. In 1855, Professor Queckett, asserted that "no achromatic has yet been made capable of separating lines closer together than 1-75,000th of an inch." "Mr. Ross found it impossible to ascertain the position of lines nearer than 1-80,000th of an inch." "Mr. De la Rue was unable to resolve any lines on Nobert's test-plate, closer than 1-81,000th of an inch." "Dr. W. B. Carpenter says, that no objective will, probably, ever be able distinctly to resolve lines closer than 1-84,000th of an inch." If these observations are correct, the existence of lines finer than this is a matter of faith rather than sight; there can be no reasonable doubt, however, that lines do exist, and the resolution of them would evince the extraordinary superiority of any objective, or any system of illumination, which would enable them to be distinguished."

The late Professor J. W. Baily, claimed to have seen lines as close together as 1-100,000th of an inch, and Messrs. Harrison and Sollitt of Hull, claimed to have measured lines on the Diatom *Amphipleura-pellucida*, as fine as 120,000, to 130,000 to the inch. R. C. Greenleaf of Boston, and Mr. Charles Stoddard, were well satisfied that they saw the lines 90,000 to the inch, with a Tolles 1-5th, and afterwards Mr. Greenleafe saw the same lines very distinctly with a Tolles 1-12th. Dr. J. J. Woodward, of Washington, states that with mono-chromatic light, and Powell and Lealand's 1-50th, and 1-25th, and 1-16th objectives a Hartnach's immersion No. 11, and Wales 1-8th with amplifier, he satisfactorily resolved the 29th and 30th bands of Nobert's test plates, the lines of which were 1-83,917 and 1-86,334 to the inch.

Dr. Woodward lately received a Nobert's test plate of 19 bands, the photographs procured from which were lately brought under the notice of the Royal Microscopic Society by the hon. secretary, Mr. Jabez Hogg, the covering glass on this test-plate was too thick for a 1-50th objective, but with all the others he was able to resolve the 17th band, 101,000 to the inch, the 18th and 19th he was unable to resolve. Both Dr. Curtis and Dr. Woodward have photographed the 16th, 17th, 18th, and 19th bands with a Powell and Lealands' 1-25. In these photographs the lines of the 16th and 17th bands can be counted with some difficulty, but the lines of the 18th and 19th cannot.

Dr. Barnard found the counting of the lines to be attended with a great difficulty, in addition to which there is another trouble, the whole width of a band is not in perfect focus at the same time, and the slightest change in focal adjustment renders it extremely difficult to fix, even with the cobweb micrometer, the last line counted.

One way of verifying the accuracy of the divisions of Nobert's test lines, is by counting them in a measured space. If 46 equidistant lines are ruled in the space of 1-2,000th of an inch, the inter-spaces must be at the rate of 90,000 to the inch. An error of one line more or less in counting the whole on such a band, would decide the rate of interspaces to be either 92,000, or 88,000, instead of 90,000 to the inch.

The foot note to Mr. Stodder's paper in the "American Naturalist," deserves notice. Speaking of Dr. Woodward's photographs, the author says, "The first fifteen bands are sharply and clearly resolved into the true lines; the fifteenth band, however, (which is ruled to the 90,000 of an English inch), requires a hand-glass magnifying four or five diameters, to show its lines distinctly." Dr. Woodward gives the following directions for counting the lines in the highest bands that can be resolved. "If a cobweb micrometer is used, the micrometer eye-piece should be firmly clamped in a stand screwed to the table, so that the eye-piece is close to the end of the microscope-tube, but not to touch it, a piece of black velvet being used to complete the connection. The motion of the micrometer-screw now communicates no tremor to the microscope, and all difficulty in counting the lines seen (whether real or spurious) disappears." Still better than this is the following method:—"The microscope being set up in a dark room, as though to take a photograph, and the eye-piece being removed, the image of the band to be counted is received on a piece of plate-glass in the plate-holder, and viewed with a focusing-glass, on the field-lens of which a black point is marked; as the focusing-glass is moved on the plate from side to side, the black point is moved from line to line. The lines may thus be counted with as much ease and precision as though they were large enough to be touched with the finger."

These photographs support an opinion given by Mr. Wenham many years ago, that the time would come when photography would reveal minute detail much plainer than it can be seen in the microscope. The reason of this is obvious. In photography the object can be illuminated by highly condensed sun-light, which will produce intense black shadows, quite unendurable to the eye, and it was with such illumination that these photographs were obtained with a Spencer 1-12th, and a Tollis 1-5th, *both dry objectives*. Dr. Woodward made five counts of the 19th band, which gave him a mean of 110,820 to the inch. The number, according to Nobert, is 112,668. Dr. Barnard counts for the 15th band 91,545; Nobert 90,074. There is a similar alleged variation in the striation of Diatomaceæ, among individuals of the same species, *Pleurosigma fasciola*, has been specially designated by Dr. Wallich, as very inconstant in its markings, as well as *Pleurosigma strigosum*, *Navicula-rhomboides*, and *Nitzschia sigmoidea*.

With the 1-8th and the 1-12th by Ross, and the 1-20th by Smith, in the possession of the Royal Microscopic Society, and with a 1-8th, a 1-12th, a 1-16th, and a 1-25th, by Powell and Lealand, all dry objectives, on a new 19-band plate, all the bands beyond the 12th seemed imperfect, the lines were not separated. But with a 1-10th and a 1-18th by Hartnarch, of Paris, a 1-16th by Merz, of Munich, and a 1-20th by Nobert, all *immersion objectives*, straight and well-defined lines were separated as far as the 15th band inclusive. Several trials by sunlight proved that the lines were thus rendered more visible, but the immersion objectives maintained their superiority by all methods.

Continental opticians and men of science have been aware of the merits of the immersion system for some years past; and, from its having received so little attention in England, continental makers do not scruple to say that the English no longer take the lead, either as opticians or microscopists.

The advantage claimed for immersion objectives are:—greater working distance between the object and objective, increase of light, and superior definition and clearness in the optical image, which image is obtained by much simpler illumination than that required in using high-power, dry objectives.

In its construction the objective is immersed in water, that is, there is a film of water between the front of the objective and the object, or thin glass covering it. An *amplifier*, is an achromatic combination inserted in the compound body of the instrument, to increase the power of the objective and eye-piece. *Angle of aperture* is the angle in the surface of the front lens, at which light will enter the objective; the greater the angle of the aperture, the more light, and to a certain extent greater resolving power; there is no evidence, however, for the statement that the resolving of test-diatoms and Nobert's test-lines is a question of *angular aperture*, since the 1-12th inch object-glass may have its *angle of aperture* extended to 170 deg., the utmost limit compatible with the reception of rays from any object; nothing is therefore gained in this respect by a reduction of the focal distance.

Before entering upon the investigation of test-objects, it would be well for every microscopist to ascertain the true magnifying powers and properties of his own instrument, English, American, and Continental European makers differ in distinguishing their instruments; each maker has generally his own system. The theoretical power of a microscope is usually measured from an arbitrary standard of 10 inches; thus a one inch is said to magnify ten diameters; a $\frac{1}{4}$ inch, forty diameters. If the standard is taken at five inches, as it is by some, then the power is but one-half as much. The power of the microscope is that of the objective multiplied by that of the eye-piece; if the objective magnifies ten diameters, and the eye-piece ten, the result is one hundred diameters.

In a scientific point of view, and next to Nobert's test plate we have a marvellous specimen of art in Herr Möllers, diatom type slide; this single slide contains over 450 diatoms, the whole are arranged and scientifically classified into four series by Herr Grunow, of Vienna, and within such a compass that the whole can be examined simultaneously with a two inch, objective, and under dark ground illumination they present a singular and beautiful appearance.

There is issued with the slide a "Systematic Catalogue," which admits of easy reference. Thus, there are nineteen objects belonging to the genus Epithemia the same number of Eunotia, five of Merediones, thirteen of Synedra, &c., &c. In the catalogue they are classed in families,—as *Epithemiæ Meridionæ. Diatomeæ Tabellariæ, Surireleæ, Nitzschiæ Amphipleuræ, Cocconeidæ, Achnantheæ, Cymbelleæ, Gomphonemeæ, Naviculeæ, Isthemiæ, Biddulphiaceæ, Eupodisceæ, Melosireæ,* and *Chaeto-cereæ.* From this it will be easily seen how to compare the different families together, and how they differ from other groups.

The objects are attached to the covering glass, like Nobert's test lines, which is very thin, so that it allows the use of high powers; both sets of lines on *Navicula Rhomboides* are resolved with a one-twentieth objective, so that each Diatom may be separately examined with deep lenses. The thickness of covering-glass required for focusing under high powers will explain the difficulty of using them. For a 1-12th and 1-16th objective the covering-glass must not exceed ·004 in. For 1-20th, 1-25th, and 1-50th, ·005 in. It was my intention to have shown Möller's Diatom Typen Plate, and Nobert's bands of Test Lines, under the microscope, at the annual soirée which the Council have fixed for the 16th of November, but from a correspondence by the last mail, I learn that they are not to be had, except at a very great price. I have received, however, from members of the Royal Miscroscopic Society, some specimens of diamond writing, &c., equally marvellous and interesting, and much better suited for the purpose, which were engraved and exhibited at the International Exhibition, class 13. The following is a specimen:—" A micrometer with divisions of 1-100th, 1-1,000, 1-2,000th, 1-4,000th of an inch, with 40 parallelograms, each of 1-100,000th of an inch; 40 parallelograms each of 1-200,000th of an inch; 80 parallelograms each of 1-400,000th of an inch; 200 parallelograms each of 1-2,000,000th of an inch; 400 parallelograms each of 1-4,000,000th of an inch; and 400 parallelograms each of 1-8,000,000th of an inch; with squares of 1-10,000th of an inch; 100 squares each of 1-1,000,000th of an inch; 100 squares each of 1-4,000,000th of an inch; and 400 squares each of 1-16,000,000th of an inch. The Lord's Prayer, the Creed, God Save the Queen, Rule Britannia, a geometric coil, the 4,137 letters in the 51 verses of the 1st Chapter of St. John, a poem upon the International Exhibition, from copper plates engraved in the Exhibition, each in a space from 1-1,600th to 1-2,000th of an inch. A Freemason's sign, which can be covered by a pin's point, &c.

There are various means employed for measuring these delicate objects, the best is undoubtedly the position micrometer, the same as the one used with the telescope for measuring the distance and angle of double-stars; but this instrument is both expensive and complicated. The method now in general use is the micrometer eye-piece, this is an eye-piece either positive or negative, having a divided glass micrometer fitted into a brass frame and placed in its proper focus. If the positive eye-piece is used, the micrometer is placed below the field-glass, but if the negative eye-glass is used, then the place for the micrometers is between the two lenses.

To find the value of the lines in the eye-piece micrometer, a glass micrometer is laid on the stage of the microscope, which is divided into 1-100th and 1-1000th of an inch, when the two micrometers are brought into focus with a low power, say a one inch objective, then if every division of 1-100th of an inch in the stage micrometer coincides with ten in that of the eye-piece, it is clear that the lines in the eye-piece micrometer are 1-1000th of an inch, the stage micrometer can now be removed, and every object corresponding to the eye-piece micrometer, under a one inch object glass can be measured to 1-1000th of an inch.

If one of the 1-1000th of an inch of the eye-piece micrometer be divided into four parts by the stage micrometer then every one of these divisions would be 1-4000th of an inch. If with any other power it is found that 1-1000th of an inch on the stage micrometer coincides with ten spaces of the eye-pieces micrometer, then the value of each division in the eye-piece micrometer would be 1-10,000th of an inch. In practice it will be found when high numbers are being observed, and the stage movement too coarse, it will be necessary to use the small milled-head screw at the end of the eye-piece micrometer, so as to bring the lines in each micrometer accurately over each other.

For the information of those who take an interest in this subject, I lay on the table the two volumes of Professor Smith's Synopsis of British Diatomaceæ. In these volumes all the objects are drawn to a scale of 10,000 to the inch, multiplied 400 diameters. Also papers containing some particulars of Möller's Diatom Typen Plate, and Nobert's Band of Test Lines, with Mr. Webb's description of diamond writing and engraving.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE WINTER QUARTER, 1869.

Observatory, Hobart Town.

Months.	Mean in Shade.		Max. and Min. in Shade		Max. Solar Intensity Black Bulb Insulated.	Min. Terrestrial Radiation on Grass.	Wind.		Rain.		Total Evaporation exposed to open Sky.
	Pressure.—Barometer corrected to 32°.	Mean Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Total Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
June ..	29·956	48·82	65·0	30·0	91·0	30·5	N.W.	27·57	9	1·55	1·32
July ..	30·032	49·15	62·0	33·0	88·0	30·0	N.W.	22·62	9	1·20	1.40
August..	29·862	51·09	72·0	34·0	102·0	29·0	N.W.	65·31	13	2·35	1·71
Mean..	29·983	49·68	66·3	32·3	93·6	29·8	N.W.	38·5	31	5·10	4·43

The Mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Winter Quarter 1869.

June 10th.—Early Narcissus commencing to flower.
,, 12th.—Maclaura aurantiaca leaves commencing to fall.
,, 14th.—Privet leaves shedding.
,, 15th.—Snow Flake commencing to flower.
,, 30th.—Leaves of Black Mulberry all shed.
July 1st.—Arbutus unedo in flower.
,, 10th.—Garrya elliptica ditto.
,, 12th.—White Mulberry commencing to leaf.
,, 15th.—Almond in full flower.
,, 20th.—Yellow Crocus in flower.
,, 24th.—White Hyacinth ditto.
Aug. 6th.—Sambucus niger commencing to break.
,, 10th.—Common Horsechestnut ditto.
,, 15th.—Elm commencing to flower.
,, 20th.—Poplar commencing to break.
,, 22nd.—Apricot commencing to flower.

Note.—The Privet was 4 days, Almond 2 days, Crocus 10 days, Hyacinth 7 days, Elder 6 days, Horsechestnut 5 days, Elm 11 days, Poplar 8 days, and Apricot 8 days *earlier* this year than last. The Maclaura aurantiaca was 2 days, Arbutus 10 days, Garrya elliptica 4 days, and White Mulberry 4 days *later*.

ROYAL SOCIETY.

SEPTEMBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 14th September, James Barnard, Esq., in the chair.

Mr. M. Allport, in the absence of the Hon. Secretary, laid on the table the usual returns for the past month, viz.:—

1. Visitors to the Museum, 1019.
2. Ditto to Gardens, 1572.
3. Plants sent from Gardens.
4. Ditto received at ditto.
5. Time of leafing, flowering, and fruiting of a few standard plants at Gardens.
6. Books and periodicals received.
7. Presentations to Museum and Library.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for August.
2. Port Arthur, from J. Boyd, Esq., table for August.
3. Swansea, from Dr. Story, table for June and July.
4. Westbury, from F. Belstead, Esq., table for August.
5. Brisbane, Queensland, from E. McDonnell, Esq., table for July, and summary of observations for 1868.
6. Melbourne, from R. J. Ellery, Esq., table for July.
7. Perth, Western Australia, from W. H. Knight, Esq., do do.

The presentations were as follows:—

1. From Mr. Oscar Hedberg, a collection of shells from the East Coast of Tasmania. [In calling attention to this presentation, Mr. Allport remarked that many of the specimens were very excellent of their kind, and although not new to the Museum, were valuable for the purpose of exchange.]
2. From Mr. Chaplin, a mineralogical specimen from Black Brush.
3. From Mr. H. McRa, specimens of Lava and calcareous Tufa, also a Spirifer, from Abyssinia, near Bothwell. A stone implement of the Aborigines.
4. From Mr. A. H. Swift, Little Taylor's Bay, two specimens of Iron Ore *(Hematite)* from Point Ventinat.
5. From G. Dinham, two fossil Shark's Teeth from the Lias, near Bath, England.
6. From Mr. C. A. Glover, 15 mineralogical specimens from West Coast of Tasmania. Also specimens of a fibrous plant, supposed by the donor to be a new species, from the same locality.
7. From Mr. G. P. Clifford, Dunedin, two Boulders *(Septaria)* from Moeraki Beach, New Zealand. [These boulders are found in large numbers on the beach referred to, and not elsewhere in New Zealand. They vary in size from that of a cricket ball up to seven or eight feet in diameter, are of calcareous composition, and are remarkable for the regularity of their form, which is almost perfectly spherical. When burned they make an excellent cement.*]

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* One of them has since been divided, and found to be hollow in the centre, the cavity being lined with crystals of Carbonate of Lime.

8. From H. Gichard, H.I.M. ship La Somme One bronze Coin, value 5 cents, one silver ditto, 50 cents.
9. From C. Heron of the same ship. Two copper Coins, Colony of Cayenne, Louis 16th, 1789, and Republic of Berne, 1796.
10. From Mr. J. Walch. A Shilling of Queen Elizabeth; a Farthing of George 2nd, 1741; a copper Coin of French Republic (L'An 5); ditto of one of the Roman Emperors, &c.
11. From Mr. F. E. Bomford. Specimens of Fluke *(Distoma sp.)* from liver of a Shark.
12. From Mr. S. H. Wintle. A Pamphlet on the Progress of Botanical Discovery in Australia. By W. Woolls, F.L.S.
13. From Mr. Kelly. A Brass Basin, probably of Indian manufacture.
14. From Mr. A. McLaren. Specimens of Barnacles from piles of Wharf.
15. From the Secretary of War, United States. Report for 1866; and Report on Epidemic Cholera, 1867. Catalogue of Surgical Section. U.S. Army, Medical Museum, 1866.
16. From the Smithsonian Institution, Washington. Report for 1865.
17. From the Boston Society of Natural History. Proceedings, volume 7, 10, and Nos. 1 to 6 of volume 11. Memoirs of ditto, volume 1, parts 1 and 2.
18. From Essex Institute, Salem, Massachusetts. Proceedings, volume 4, parts 1 and 2 of volume 5, and Naturalists' Directory, No. 1.
19. From American Philosophical Society, Philadelphia. Proceedings volume 10, No. 76.
20. From the American Academy of Arts and Sciences. Proceedings, volume 6.

The special attention of the meeting was called to the very liberal donation of books, some of them of a very expensive character, lately received from the Government and various scientific institutions of the United States. The books had been sent in return for publications of the Society forwarded to the donors, a system of exchange having been initiated some time since through the Smithsonian Institution at Washington.

Mr. M. Allport read a paper on "Net Fishing in the River Derwent," in reference to which several of the Fellows present fully bore out that gentleman's statements as to the permanent damage entailed on the fisheries by the use of the small meshed seine nets.

Special votes of thanks were accorded to the American Government, the Smithsonian, and other institutions, for the donations of books. Also to Mr. Allport for his very able paper. The proceedings closed with the ordinary vote of thanks to the donors of presentations.

OCTOBER, 1869.

The monthly evening meeting of the Fellows was held on Tuesday, the 12th October, C. Gould, Esq., F.G.S., in the chair.

The hon. Secretary, Dr. Agnew, submitted the usual returns for the past month, viz. :—

1. Visitors to the Museum, 880.
2. Ditto to Gardens, 2,355.
3. Plants and seeds sent from, and received at Gardens.
4. Times of leafing, flowering and fruiting of a few standard plants in Botanic Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for September.
2. Swansea, from Dr. Story, table for August.
3. Westbury, from F. Belstead, Esq., ditto for September.
4. Port Arthur, from J. Boyd, Esq., ditto, ditto.
5. Sydney, from G. R. Smalley, Esq., Government Astronomer, table for June.
6. Melbourne, from R. J. Ellery, Esq., table, &c., for August.
7. Perth, Western Australia, from W. H. Knight, Esq., table for August.

The following presentations to the Museum were brought under the notice of the meeting :—

1. From Captain Roberts, a Snake and three Centipedes.
2. From F. B. Wilkinson, Esq., a Mountain Duck *(Casarca tadornoides)*.
3. From Mr. W. Exton, Oatlands, a Chestnut-faced Owl *(Strix castanops)*.
4. From Mr. R. Propsting, a Harrier (*Circus assimilis*). [This bird is known as the "Swamp Hawk" of the colony.]
5. From A. H. Maning, Esq., a Sun Dial, made and used by Spanish shepherds.
6. From Mr. H. Turner, an Irish Penny, and a Sydney Token.
7. From Miss Castray, Leaves of Silver Leaf Tree from Table Mountain, Cape of Good Hope; a Damara Lady's Necklace, from South Africa.
8. From Mrs. J. R. Buckland,—A Bullet from a double-barrelled gun, found loaded, on the 30th May, 1859, by the side of two skeletons belonging to the retreating party of Sir John Franklin's expedition, in a boat on the west coast of King William's Island, lat. 69deg. 8min., N., long. 99deg. 24min., W. [Vide "Fate of Franklin and His Discoveries," by Captain McClintock, page 294.] A portion of a Boat's Ensign, belonging to the same expedition, left at the Northern Cairn, Cape Felix, May, 1847, and discovered May, 1859, by Lieut. Hobson, of Lady Franklin's screw yacht Fox. A portion of the Riband of the Order of the Redeemer, of Greece, worn by the late Sir John Franklin. An Almond from the Convent Garden on Mount Sinai.
9. From Mr. W. Knight, jun.,—A collection of Geological Specimens brought by Mr. Glover from the western coast of the Island.

The Secretary brought under notice a model of a Reel invented by Sergeant Eccleston, R.A., Instructor of Artillery, to be used for the purpose of winding up the line in deep sea fishing. A letter descriptive of the manner of using it, and setting forth its advantages, was read.

Mr. Stephens read some "Notes on the occurrence of gold at Port Cygnet."

Mr. Gould was much interested in the information contained in Mr. Stephens' paper, as he had not had an opportunity of minutely examining the country about Port Cygnet. The discovery of fossils in the quarry alluded to, would be of the greatest importance, and he hoped, if any were discovered, they would be preserved for scientific examination. As to the specimens on the table, said to have been obtained from the vicinity of Port Davey, although he had visited that part of the country, several of them were new to him. He would instance more particularly the serpentine, which was much more like that on the North of the Island than any he had seen to the westward. Further information, however, was much required, as the specimens lost a great deal of their interest by not having labels affixed; and geological specimens generally were of very little value if not accompanied by a notice, defining exactly the localities in which they were found.

Mr. J. W. Graves mentioned that gold in small quantities was discovered at Port Cygnet in 1852.

Mr. Stephens was anxious to induce Fellows to send specimens of natural history to the Museum, which, in many respects, was still very deficient. He would refer to one subject alone, that of our land shells. Of these, we had no proper collection, and if any information in reference to them was required, it would have to be sought for in the private museum of a naturalist (Dr. Cox), in Sydney—a circumstance which was scarcely creditable to us.

Mr. Justin Browne observed that at a former meeting he had suggested that lists of such objects as we wanted might be exhibited at all the Post Offices in the interior, and he thought that if our wants were thus made generally known, many people in the country would send contributions.

The Secretary informed the meeting that lists of desiderata for the Museum had been printed and forwarded to all the Fellows, and to many others. Scarce any response was, however, made to the appeal, except by Mr. W. Gellibrand, and also by Mrs. C. Meredith, who had contributed many valuable preparations of our sea-weeds and other objects.

Mr. Graves mentioned he had lately received from Mr. Groombridge, of North West Bay, a black Wallaby. He had frequently seen the Albino variety, but had never seen or heard of a black one. He was inclined to believe it might be found to be a new species. It was now alive at his house for inspection.

Mr. Castray (A. C. G.), in referring to presentation No. 7, observed if it was thought advisable by the Society to make exchanges of plants and seeds with the Cape, Mauritius, or Madagascar, that he would be happy to be the means of effecting such exchange, as he had correspondents in those places. Mr. Castray's offer was at once accepted.

Mr. Graves enquired if there were any berry-bearing wild plants at any of the places named, as such, if suitable to this climate, would be of great value both for our indigenous and acclimatised animals?

Mr. Castray thought there were some at the Cape which might be introduced with advantage.

A vote of thanks having been accorded to Mr. Stephens for his paper, and to the donors of presentations, the meeting terminated.

NOVEMBER, 1869.

The monthly evening meeting of the Fellows, the last of the session, was held on Wednesday, the 16th November, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns for the past month:—

1. Visitors to Museum, 3204.
2. Ditto to Gardens, 2624.
3. Times of leafing, &c., of a few standard plants in gardens.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., table and summary for October.
2. Port Arthur, from J. Boyd, Esq., table for ditto.
3. Swansea, from Dr. Story, table for September.
4. Sydney, from G. R. Smalley, Esq., tables for July (printed).
5. Melbourne, from R. L. J. Ellery, Esq., table and notes for September.
6. New Zealand, from Dr. Hector, tables for June and July.
7. Westbury, from F. Belstead, Esq., table for October.

The presentations to the Museum were as follows:—

1. From Captain Garth, an albatross *(Diomedia exulans)*, caught on the East Coast of the colony.
2. From Miss Peck, an English barn owl *(Strix flammea)*, prepared and mounted.
3. From Salmon Commissioners, a Salmon Smolt, caught in the Derwent.
4. From Mr. M. Allport, two fish from Wedge Bay.
5. From the Hon. J. Maclanachan, Esq., a Pheasant, a cross between the English and Chinese varieties.
6. From Mr. J. C. Edgar, Sorell, 7 specimens of Land Shells.
7. From Mr. W. Legrand, 2 specimens of Land Shells. *(Bulimus Tasmanicus.)*
8. From Mr. E. D. Swan, polished specimen of Fluor Spar, from Derbyshire, England.
9. From Mrs. New, Bagdad, for Mr. J. Davies, a brown Trout *(Salmo fario)* caught in the Bagdad creek.
10. From G. Luttrell, shell impressions from Port Cygnet.
11. From Captain Williams, two samples of water from a mineral spring at Spring Bay. Also the tail of a large Tunny, which was driven on shore by a porpoise at Spring Bay. The fish weighed over 400 lbs.

Mr. J. Davies presented for examination a sample of gold, weighing about 1¼ oz., which he could state from excellent authority was obtained by two men, in two days' work by digging at the Black Boy Reef at Mangana.

Mr. Davies also submitted a sample of so-called jewel-sand for the purpose of obtaining the opinion of the Society as to the fact of its containing precious stones. (This sand has been examined under the microscope, but no valuable stones were found to be present; it contained, however, a considerable proportion of fine gold.)

Mr. M. Allport called attention to the presentation of a smolt by the Salmon Commissioners as placing upon record the first incontestable proof of the success of the grand experiment in which the Royal Society of Tasmania had from the first taken so deep an interest. The last of the smolts hatched from English eggs left for sea in October, 1868, and, if not destroyed, those fish must either be grilse or approaching grilse-hood; that is to say fish of from two pounds to eight pounds in weight, whereas the largest of the fish now caught weighs under half a pound, and carries with it a proof of its having but just left fresh water, as the silvery scales came off at the slightest touch, leaving the colour and markings of the parr distinctly visible beneath. It is therefore certain that these smolts are the produce of the Colony, as the parent fish must have returned from sea to deposit the ova from which such smolts were hatched. Doubts have been expressed by many colonists as to the nature of the fish, one specimen of which has been just presented to the Museum, and a slight reference to the subject is therefore necessary. In the first shipment—which arrived in 1864—the only migratory species introduced was the salmon *(Salmo salar)*, while the second shipment—which arrived in 1866—contained two—the salmon and the salmon trout *(Salmo trutta)*,—and it follows that these smolts, caught in salt water, must belong to one of these two species, though one learned gentleman has expressed his opinion that they are river trout *(Salmo fario)*, in happy ignorance that the latter species cannot live in salt water. The second shipment arrived here early in the year 1866. In October, 1867, a portion of the smolts of that shipment left for sea. In October, 1868, the remaining smolts all left except a few salmon trout *(Salmo trutta)*, retained in a pond for breeding purposes. The salmon trout so retained, although well-grown, healthy fish, showed no signs of spawning till the winter just past, and their progeny are now about an inch and a half long. It is, therefore, probable that the fish which went to sea in October, 1867, did not return as spawners till the winter of 1869, in which case the smolt now exhibited can only be the young of the salmon *(Salmo salar)*. Again of the salmon *(Salmo salar)*, about 8000 are known to have left the ponds, and it is probable that about 2000 more ought to be added to that number, while of salmon trout *(Salmo trutta)* not more than 300 fish can have gone—in addition to which it must be remembered that the salmon have been two years longer in the river. In answer to those who unhesitatingly assert that these smolts are salmon trout, it may be mentioned that the first authorities in the world on the Salmonidæ expressly point out that the various species of the genus Salmo in their immature stages closely resemble one another, and that a very slight variation from the normal type, which variation is by no means uncommon, may make it most difficult to determine the species of any single specimen, and we should therefore receive the decisive opinions of gentlemen who have no specimens to refer to with some degree of caution, especially when those opinions are strongly opposed to the probabilities. One specimen has been sent to Dr. Günther (a leading authority on the subject) by the Salmon Commissioners with a view to obtaining his opinion as to its species before handing it to Mr. James A. Youl, to whom it is to be ultimately presented. After all if, with the chances so much against it, these should be salmon trout instead of salmon, the success of the experiment is none the less proved, as if one migratory species can succeed with a few hundreds turned out, how much more likely is the other to succeed when several thousands were liberated.

The Hon. Secretary read a paper by E. D. Harrop, Esq., F.R.M.S., of Launceston on the *Phyllactidium pulchellum*, one of the Confervoid Algæ. Specimens of this, and of several others of the same group, beautifully mounted by Mr. Harrop, were presented by him to the Museum.

The usual vote of thanks (proposed by Mr. Bilton) to the donors of presentations, and the author of the paper, being passed, the meeting broke up, and the fellows adjourned to the large room in which the Society's annual Microscopical Exhibition was being held.

Here twelve instruments were at work with objects in great variety, and, as Fellows have the privilege of introducing ladies to this meeting, the room was filled with pleased and interested visitors. The exhibitors were Messrs. F. Abbott, F. Abbott, jun., Agnew, M. Allport, E. Giblin, W. Johnston, Legrand, Napier, W. Stone, and Roblin.

Mr. Abbott exhibited a great variety of instruments and objects of scientific interest, including groups of Diatoms, test lines after Nobert, specimens of diamond engraving, &c.

Mr. F. Abbott, jun., by means of a binocular instrument, showed a series of metallic substances, embracing Gold, Copper, Iron Pyrites, &c.

Dr. Agnew exhibited specimens of Confervoid Algæ, received from and mounted by Mr. E. D. Harrop, of Launceston.

The circulation in the Tadpole was well displayed by Mr. M. Allport, and by Mr. E. Giblin, who also showed a micrometer, together with various crystals by polarized light, insects, &c., &c.

Mr. Legrand had a series of twelve varieties of Tasmanian Polyzoa.

Mr. Napier displayed some exquisite crystals under polarized light, and also specimens of English Polyzoa.

Sections of Colonial Woods, and other objects, were shown by Mr. W. Johnston, Trinity Hill.

Mr. Stone and Mr. Roblin exhibited the circulation of the sap in the *Nitella flexilis*, and the latter also showed the cup-like covering of the larva of a manna-making insect *(Psylla sp ?)* from leaves of the Eucalyptus, presented by Mr. S. H. Wintle.

The various objects under view were carefully examined by the numerous visitors, many of whom before leaving expressed their sense of the gratification and pleasure which had been afforded to them by the exhibition.

NET-FISHING IN THE DERWENT.

By Morton Allport, F.L.S., F.Z.S.

During the months of November, December, and January, when the freshets caused by the winter's rains having subsided, and the tidal waters get low and brackish, shoals of fish commence running up from Storm Bay and the open coast into the estuary of the River Derwent, for the purpose of depositing spawn in the shallow landlocked bays, which abound from Rosny and Macquarie Point upwards.

Of such fish, the most valuable are Flounders and Soles; the other being Bream, Mullet, Mackerel, Native Salmon, Kingfish, and a few species of comparatively minor importance.

No exact season can be fixed for the spawning of any of these fish, the time of the deposition of the ova varying in different years from causes of which naturalists are at present ignorant; and even in the same summer, many weeks often elapse between the deposition of the first and last spawn of each particular species. The parent fish having deposited the spawn, remain in the river, safe from the attack of their more formidable marine enemies, till their strength is recruited, and return to the sea with the first floods of winter.

The development of the spawn and subsequent progress of the fry are not so well ascertained as the habits of the parent fish; but the probability is, that the fry—like those of most summer spawning fish—are very rapidly hatched, and increase their weight quickly at first, as otherwise they could never hold their own against the attacks of the innumerable enemies to which they are subjected in their early helpless stages. The fry of several species remain through the winter in the comparative security afforded by the sheltered waters of the river, leaving for sea at the end of the following autumn, and becoming marketable in the ensuing spring—two years after they are hatched.

Forty years ago, the bays near Hobart Town swarmed with fish during the summer months, and flounders and soles could be caught in any quantity on all the beaches at Sandy Bay. Vast shoals of Bream, Mullet, and Native Salmon, made their way up to the junction of the fresh and salt water at Herdsman's Cove, in the Jordan, and above New Norfolk in the Derwent, at both which places angling was for several years afterwards successfully carried on.

In the summer months, between the years 1840 and 1850, anyone standing on the rocks near Green Point might have seen myriads of large fish passing and repassing with each tide, in and out of the estuary of the Jordan, and Bream of two or three pounds each played in thousands about the shallows above Bridgewater, and at New Norfolk.

In those early days and for many years afterwards, all the fish required for the Hobart Town market were easily obtained in the neighbourhood, and comparatively few nets were worked, but as the town grew the demand became larger; the number of nets increased, they were worked night after night without any reference to season, or restrictions as to the sale—everything with fins was swept up, and the nearest bays denuded of their fish.

The nets used were seines of great length, with meshes generally less than an inch square; they were paid out from the stern of a boat in a large semicircle, and then hauled from both ends on to the shore. The fishing was carried on at night, when the bulk of the fish referred to were feeding in the shoal water, or depositing their spawn—in the latter case much of the spawn must have been totally destroyed, because the weeds upon which it was hung would choke the lower portion of the net, and weeds, spawn, and minute fry would alike be drawn on shore and left to perish.

As the bays which were fished near town became exhausted, the men began to follow the unfortunate spawning fish further and further up the river. Unprotected by any law, that which ought to have been regarded as a nursery, from which to supply the lower waters periodically with marketable fish, was more and more encroached upon, and as might have been expected, the fish grew scarcer and scarcer and smaller and smaller, till flounders two inches across, and mullet three inches long were to our national disgrace hawked about the streets. Line fishing above the town became a mockery, and those who remember the sport of other days gave it up in utter disgust.

Angling in the upper waters fared no better, and was partially abandoned, while half a dozen net fishermen continued doing their utmost to kill the goose, which, with proper care, ought to have provided them and their descendants with golden eggs for all time.

In the year 1864, it became necessary, in order to ensure the safety of the few dozen of salmon smolts then descending the Derwent, to put some restraint upon the excessive netting in the river, and the Salmon Commissioners availed themselves of the power given them under the Salmon Act, and recommended the suppression of all netting above the town. At the time, one or two men made a faint show of resistance to this measure, but did not press the subject probably because, having so far stripped the river, there was not much lost by the restriction.

The improvement consequent upon stopping the netting soon became apparent. Towards the end of the second season the hand-line fishing from boats near town improved considerably, and the fish have since steadily increased both in quantity and size. Angling has been resumed with great success in the lower waters, and is gaining in favor as a healthy and profitable recreation each year. Near the mouth of the Sorell Rivulet shoals of large bream have been constantly seen, where, a short time ago but few, and in some seasons, none showed themselves, One man who has fished the river for more than 30 years, and on whose veracity I can rely, assures me that he has seen a shoal of these fish covering half an acre, and that he believes the river will soon be what it was in its best days.

The bays about New Town and Risdon have been alive with fish during the last season, and anglers in those waters rarely failed to make good baskets.

This abundance of fish in the bays above the town has now excited the cupidity of those few net fishermen who do not consider anything beyond their present gain, and who for the sake of two or three good seasons would not only run the risk of wasting all the money and labour expended, for their own ultimate benefit, in the salmon experiment, but would even wantonly sacrifice the permanent interest of the public, and especially of the angling and line fishing public, by scraping up every spawning fish they can follow to the shallows, and thus undo all the good work which the Salmon Commissioners have done by placing some restriction on the netting.

These fishermen are now urging Parliament to re-open the river, and those who advocate this to do so mainly on two grounds, one the hardship to the fishermen by taking away their means of livelihood, the other the advantage to be gained by catching a veritable salmon, and proving beyond doubt the success of the experiment.

As to the first ground, it is difficult to understand why the presence of a larger number of fish in the upper waters makes the hardship any greater now than it was in 1864. On the contrary; the closing the river has each year tended to make the fishing in the lower waters better at those seasons in which the fish ought to be caught.

Had the net fishermen been allowed to go on as they had commenced, the river would soon have yielded them no profit at all, either in the upper or lower waters, a hardship much more serious than any they can now be subjected to by keeping the upper waters closed, as each winter will bring a fresh supply of marketable fish within reach of their nets.

It is also stated that in severe southerly weather the men must either go up the river or lie idle at great loss, but the upper waters are only worth netting in summer and autumn, when southerly gales are rare. The men who are really the sufferers by heavy southerly weather, are not the seine net men, but the deep-sea fishermen, who have to get from 20 to 60 miles out on to the exposed coast.

It is a rather significant fact that since the closing of the river, deep-sea well-boats of superior build have increased in number, and, with the single exception of flounders, the better fish have been brought to market in such numbers that real trumpeter are now cheaper than when the river was open, although quantities are occasionally sent to Melbourne.

It is quite probable that if the upper waters were thrown open during the next two seasons, there would be for a time such a supply that the market of the deep-sea fish might be materially affected, and some of the boats withdrawn from an industry which deserves every encouragement—in other words, we should sacrifice a legitimate trade for that which ought to be considered illegitimate.

Even if some hardships could be shown to exist, surely the future interests of the whole public are not to be sacrificed for the immediate and short lived benefit of some two dozen men, for it must be remembered that in the port of Hobart Town, the whole of the boats and gear fitted for this destructive fishing, are the property of two individuals, and that the hands employed in it rarely exceed 20 at any one time. The injury inflicted upon these 20 men and their families, by the closing of the river, can only be estimated at the difference between the wages they used to earn at the fishing in 1864, when it was failing perceptibly, and what they can now earn at any other occupation, and that difference must be trifling.

As to the second ground upon which the opening of the river is advocated, it is by no means certain that allowing the nets to be worked for a few miles up the river would lead to the capture of salmon, for there can at present only be a few mature fish scattered over a wide expanse of water, and no net really adapted for salmon fishing in the wide tidal waters, with a mesh eight inches round when wet, it is to be found in the colony, and if it could be found it would not suit the purpose of those fishermen, who, caring little for the success or failure of the salmon experiment, simply wish to scrape out everything saleable, and would never be satisfied to use a mesh through which a fair sized smolt could pass.

Again, it is quite possible that the space travelled over by the salmon in their migration seaward may depend much upon their supply of food, and that, while the fish are scarce and their food abundant, they will not travel far from the junction of the fresh and salt water.

Granting that salmon might be caught by opening the river and using proper nets, is it not manifest that the rapid stocking of our rivers would be more seriously retarded by killing half-a-dozen salmon now, when only a few pairs reach the spawning beds, than by killing as many thousands a few years hence, when every gravelly rapid over hundreds of acres will be tenanted by spawning fish?

NOTES ON THE OCCURRENCE OF GOLD AT PORT CYGNET.

By T. Stephens, M.A.

A visit recently paid to Port Cygnet has resulted in a discovery which is not without interest from a scientific point of view, if nothing more. Having had to traverse the Huon district in all directions for several years past, in the discharge of official duties, I had become tolerably familiar with its principal geological features, which present few variations from those that prevail in the neighbourhood of Hobart Town, and the greater part of the Derwent basin. If a line be drawn from the East Coast through Campbell Town to the Great Lake, and thence southwards to Recherche Bay in a direction nearly corresponding with the course of the 147th meridian, the area included between this and the coastline is the only large section of Tasmania in which there is no ground for expecting discoveries of gold or other valuable metals. The sedimentary rocks of the whole of this area may be described in general terms as Upper Palæozoic. They comprise the carboniferous series, and probably pass upwards into the counterparts of rocks now established in Victoria as Mesozoic, and they are here and there overlaid by Tertiary and Post-tertiary deposits. The whole series, to the Tertiary inclusive, has been penetrated and intersected to an extraordinary extent by trappean and basaltic rocks, which frequently hide the sedimentary strata altogether from view over extensive tracts of country.

But none of the older rocks, the recognised source of gold wherever it has been found in paying quantities, have hitherto been known to exist within this area, and as the greater part of it has been pretty well explored by the geologist, it is only in an odd corner, here and there, that their presence comes within the range of possibility. The oft repeated announcement of the discovery ot gold in small quantities at Port Cygnet, added to a previous acquaintance with the indications of extensive denudation of the upper Palæozoic sandstones and mudstones in that neighbourhood, suggested to me the idea of paying closer attention to the spots where any of the primary rocks, which by any chance had been elevated above the sea level, might be expected to show themselves. And after a brief examination of the rock exposed in a quarry near the southern extremity of the township, and in a small tributary of the Agnes Rivulet, I have little hesitation in pronouncing it to be of earlier date than any which has hitherto been recognised in the above-mentioned area. It varies in character from a soft arenaceous clay slate to a hard compact grit, containing in places rolled pebbles and boulders of schistose or metamorphic rocks, with porphyries and granite, and is in all respects analogous to portions of the old conglomerates of the North Coast, which are undoubtedly of Silurian age. It occurs on both sides of the Agnes Rivulet, which seems to occupy a synclinal hollow, and it is evidently unconformable to the Upper Palæozoic mudstones by whose denudation it has been exposed. The ruling angle of dip is about 60°, the strike being nearly north and south. The rock is in places highly impregnated with iron pyrites, and I noticed faint impressions, apparently of organic origin, but too indistinct to be made out on the spot, and the matrix too perishable to allow of its removal for examination. Until some fossils have been discovered and identified, all further speculations as to geological age are quite futile, but the search for them I must leave to those who have plenty of leisure time.

The existence in this neighbourhood of an interesting porphyritic rock, containing large crystals of felspar, has long been known. Though peculiar to the district it is analogous in several respects to many common members of the trappean series, but the entire absence of hornblende, which in them is a distinguishing feature, is noticeable. It is clearly newer than the grit just described, which it intersects in the form of a vast dyke on the western side of the township, another branch showing itself in a quarry near the new slab road; and it seems probable that the quartzose veinstones, which have been quite recently met with, and which appear to traverse the porphyry near some of its points of contact with the older rocks, are the source of the gold which has been sparingly found in the alluvium of adjacent gullies. Whether a careful assay of specimens from these veinstones will result in the establishment of this theory remains yet to be proved. Unfortunately the most interesting part of the quarry last referred to, is now under water, and there is no other spot in the neighbourhood which affords similar facilities for investigating the subject. There are well authenticated instances in Victoria of the occurrence of auriferous veins of similar character in diorites closely allied by their geological relations to the porphyry of Port Cygnet, but I see no grounds at present for advising any large outlay in the search for gold. It is clear that in the shallow alluvium, where it has hitherto been found, there is no prospect of an adequate return for the expenditure of labour and capital, and it is equally clear that the deep ground, where there is only a remote probability of the existence of an auriferous lead, could not be worked except at very great expense. Again, the quartzose veins of the porphyry have not yet been seen developed in any practicable shape. Attention has however been directed to the subject, and it is by no means improbable that continuations of these veins will some day be traced into the more substantial forms by which, under similar geological conditions, they are elsewhere represented.

THE PHYLLACTIDIUM PULCHELLUM.

By E. D. Harrop, F.R.M.S.

Phyllactidium Pulchellum ...	Kutzing.	Gray.
Coleochæte Scutata	Brébison.	Hassall.

It may be well to place on record the fact that this beautiful microscopic plant has been noticed in Tasmania; and as so little is known of it even amongst microscopists, I will, at the same time, with the permission of the Fellows of the Society, describe it, and give a few lines on its history.

The first occasion on which it was observed here was last year by Mr. Sale, of Launceston, by whom it was found adhering to the glass sides of his aquarium, and since then I have discovered it in its natural habitat, namely, the leaves and stems of water plants. I send prepared specimens for examination by the Fellows.

Although this plant was discovered in England in 1844 by Mr. Ralfs, who published a paper describing it in the "Annals of Natural History" in 1845; yet so seldom had it been noticed by Algologists, that Dr. Gray, F.R.S., described it in "Seeman's Journal of Botany," in 1866, as new to Great Britain. Kutzing appears to have been its first discoverer in 1838, when he met with it growing in an aquarium. Brébison also observed it in 1844 at Falaise, growing on the leaves and stems of inundated and in part decomposed water plants, principally on the Sparganium natans and Potamogeton natans. He named it the Coleochæte Scutata, and from the setigerous sheaths, growing sometimes numerously from the upper portion of the cells, considered that it should be placed in the Chætophoroidæ, and near the Bulbochæte. The generic and specific names of Phyllactidium pulchellum first given it by Kutzing, and confirmed by Gray, are those by which it is now known.

From the fact that this plant has generally been found associated with, or rather in water in which the Volvox Globator has been abundant, it was presumed by some observers that there was some connection between the plants; but its affinities are with quite another family of the Confervoideæ, namely, the Chætophoraceæ.

From most, if not all, of these plants there grows on the back of some of the cells a sheath having a bulbous base, and from out of which apparently issues a delicate setaceous filament of considerable length. These setæ are not always met with, and I should say are rarely seen in mounted specimens, as they are extremely caducous. It is these setaceous filaments which place this remarkable plant in the family Chætophoraceæ of the Confervoid Algæ, and at the same time would appear to ally it to the Bulbochæte, with which genus Hassall considers it has close affinities.

On the specimens on Slide No. 2, which were taken from the stem of a water plant, there will be noticed on the back of the cells nearer the margin than the centre, several masses of Eudochrome. These are the Sporangia. The reproduction of the plant is said to be effected by zoospores as well as spores, the zoospores being produced singly from the cell contents and bearing two cilia. With plants so minute, observation in respect of the reproduction by zoospores is extremely difficult, and it is but rarely, indeed, that such points can be noted,and only when one is so fortunate as to have a specimen under examination in which the zoospores are on the point of escaping from the cells. This is quite possible when the plant grows in an aquarium, through the sides of which it may be observed with a glass from day to day.

Dr. Gray describes the organism as follows :—" The form is discoidal, circular, slightly concave on one side, formed of very minute, nearly equal sized square cells, placed on forked lines regularly spreading from a central cell to the circumference; the frond is thin, membranaceous, and the upper and under surfaces are similar. The fructification consists of from twelve to sixteen square thickened patches, forming a circle (sometimes two) rather nearer the margin than the centre of the disc, the square patches being often placed in pairs. The fructification was first observed by Suringar in his thesis entitled " Observationes Physiologicæ," delivered in Leyden, 3rd March, 1857."

This description fails to include the setigerous sheaths, which is an important omission, being that part of its organisation above others which has enabled botanists to give the genus its natural position.

The sheath and filament are well shown on a specimen in preparation No. 2, where the delicate filament will be seen to issue from the setigerous sheath for a length almost equal to the diameter of the frond; and in both of the preparations (Nos. 2 and 3) of the plant taken from the natural habitat there can be seen, with a little management of the light, numerous sheaths. Specimen No. 1 grew on the glass side of an aquarium, and it will be noticed how much finer the frond is than in those taken from the stems of water plants, so much so that one might be led to consider it a variety. I think it is a perfectly mature frond as regards size, as the plants disappeared from the aquarium shortly after it was collected. The plant may, moreover, develope better on the smooth glass than on the rougher stems of water plants; in fact, it is just one of those conditions that might fairly be supposed to give rise to a variety.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SPRING QUARTER, 1869.

Months.	Mean in Shade.				Solar Intensity Black Bulb Insulated.	Terrestrial Radiation on Grass.	Wind.		Rain.		Evaporation exposed to open Sky.
	Pressure. — Barometer corrected to 32°.	Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
Sept. ..	29·947	52·81	75	31	93·77	39·75	N.W., S.E.	62·71	9	0·98	3·52
Oct. ..	29·766	57·58	73	40	102·47	46·13	N.W., S.E.	46·29	15	3·32	2.82
Nov. ..	29·706	59·51	78	40	102·13	45·63	N.W., S.E.	52·01	14	1·87	4·22
Mean..	29·815	56·63	75·3	37·0	99·45	43·50	N.W., S.E.	53·67	38	6·17	10·56

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Spring Quarter, 1869.

September 8th.—Common Ash commencing to break into leaf.
,, 12th.—Grape Vines commencing to start.
,, 15th.—Common Oak commencing to break into leaf.
,, 16th.—Moutan Peony commencing to flower.
,, 22nd.—Horse Chestnut ditto ditto.
,, 25th.—Robinia Pseudo-acacia commencing to break into leaf.
October 5th.—Carpinus Betulus commencing to break into leaf.
,, 12th.—Ailanthus Glandulosus ditto ditto.
,, 16th.—Common Lime ditto ditto.
,, 17th.—Black Mulberry ditto ditto.
,, 20th.—Elm Seeds commencing to fall.
,, 26th.—Melia Azederach commencing to break.
November 5th.—First Strawberry (Marguerite) gathered.
,, 10th.—First Cherry (May Duke) gathered.
,, 14th.—Black Mulberry in full flower.
,, 20th.—Pomegranate in flower.
,, 21st.—First Raspberry gathered.
,, 28th.—Bougainvillea Spectabilis in full flower.

NOTE.—Strawberries were four, Cherries six, Black Mulberry seven, and Pomegranate six days later this year than last; the time of the remainder of the above plants being about the same as last year.

METEOROLOGICAL AND BOTANICAL ABSTRACT, FOR THE SUMMER QUARTER, 1869-70.

Months.	Mean in Shade.				Solar Intensity Black Bulb Insulated.	Terrestrial Radiation on Grass.	Wind.		Rain.		Evaporation exposed to open Sky.
	Pressure.—Barometer corrected to 32°.	Temperature of Air.	Maximum of Air.	Minimum of Air.			Prevailing Currents.	Force.	No. of Days.	Amount collected.	
	Inches.	°	°	°	°	°		lbs.		In.	In.
Dec. ..	29·739	61·55	84	40	107·23	38·0	N.W., S.E.	78·83	15	1·47	5·80
Jan. ..	29·758	66·62	99	45	107·60	42·5	N.W., S.E.	92·63	9	4·57	5.00
Feb. ..	29·928	63·45	92	42	107·36	39·0	N.W., S.E.	60·88	5	0·35	5·32
Mean..	29·805	63·87	91·6	42·3	107·39	39·83	NW., SE.	77·44	26	6·39	16·12

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The twenty-five years' standard tables are used for obtaining the difference from the average.

FRANCIS ABBOTT, Private Observatory.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens, for the Summer Quarter, 1869.

December 10th.—First Red Currant ripe.
„ 11th.—Common Privet commencing to flower.
„ 14th.—Black Currants commencing to ripen.
„ 15th.—Melia azederach commencing to flower.
„ 16th.—Doyenne d'Ete Pear commencing to ripen.
„ 20th.—Juneating Apple ditto ditto.
January 1st.—First Apricot (Royal) gathered.
„ 8th. —Grevillea robusta in full flower.
„ 9th.—Jargonelle Pear ripe.
„ 12th.—Mulberries commencing to ripen.
„ 14th.—Veronica angustifolia in full flower.
February 1st.—Kerry Pippin Apple commencing to ripen.
„ 2nd.—Windsor Pear ditto ditto.
„ 6th.—Greengage Plum ditto ditto.
„ 15th.—Common Ash commencing to shed seed.
„ 18th—Sycamore ditto ditto

NOTE.—Red Currants were six days, Privet six days, Black Currants six days, Melia azederach three days, Doyenne d'Ete Pear two days, Juneating Apple five days, Apricot nine days, and Grevillea two days *later* than last season; and Kerry Pippin Apple was three days, Windsor Pear four days, Ash three days, and Sycamore four days *earlier*. The remainder were about the same time as last year.

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

1869.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART TOWN.
1870.

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Her Majesty

The Queen.

Royal Society of Tasmania.

Patron:

HER MAJESTY THE QUEEN.

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H. COOK, Esq.

Auditors of Monthly Accounts:

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Curator of Museum:

MR. T. ROBLIN.

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List of Fellows.

† *Denotes Life Membership.*

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Butler, J.	Badgad
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Buckland, H. J.	,,
Browne, Justin McC	,,
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Cook Henry, M.H.A.	Hobart Town
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Crawford, Lieut.-Colonel	New Town
Cruttenden, Thomas	Woodsden
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Davies, John, M.H.A.	,,
Dear, R. E.	,,

Dobson, Hon. W. L., M.H.A.	Hobart Town
Dobson, H.	,,
Dunn, J. A.	,,
D'Emden, H. J.	,,
Du Cane, His Excellency C.	Government House

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Fitzgerald, Robert	Hobart Town
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Giblin Thomas	,,
Gould, C., F.G.S., Government Geologist	,,
Gorringe, Thomas	Green Ponds
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Hunter, Henry	,,
Huston, G. F.	New Norfolk
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Ingle, J.	England

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Knight, W., jun.	Sandy Bay

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Lowes, Hon. T. Y., M.L.C.	Glenorchy

Maclanachan, James	Ballochmyle
MacNaughtan, Alexander	Hobart Town
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Maxwell, C. M	,,
†Milligan, Joseph, F.L.S.	England
Moore, J. A.	New Norfolk
Meredith, Hon. C., M.H.A.	Hobart Town
Morrison, Askin	,,
Marsh, H. J.	,,
Mace, J. C.	Clarence Plains
Mace, G.	Spring Bay
Napier, G. R.	Hobart Town
Nelson, H.	,,
Officer, Hon. Sir Robert, M.H.A., Speaker	New Norfolk
Pillinger, J.	Antill Ponds
Roberts, H. L.	Hobart Town
Salier, G., M.H.A.	,,
Sharland, W. S., M.H.A.	New Norfolk
Solomon, Joseph	Hobart Town
Stephens, T., M.A., Inspector of Schools	,,
Story, J. F.	Swanport
Storie, Rev. J.	Hobart Town
Susman, L.	,,
Stone, W.	,,
Swan, E. D.	,,
Scott, J., M.H.A.	Launceston
Scott, J. R., M.H.A.	New Town
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Turnley, G. W.	Launceston
Walch, James	Hobart Town
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Whitcomb, G.	Hobart Town
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Wilson, George, jun.	Mount Seymour

Wilson, Hon. J. M., M.L.C.	Hobart Town
Wise, F. H.	,,
Woolley, J.	,,
Wilkins, A.	England
Webster, A. G.	Hobart Town
Wright, Stephen P. H.	,,
Young, Russell	,,

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 28th January, 1870: T. Giblin, Esq., in the chair.

The following gentlemen, who had been previously nominated by the Council, were, after a ballot, duly elected as Fellows of the Society :—Rev. H. D. Atkinson and Horatio Nelson, Esq.

The CHAIRMAN having read the advertisement by which the meeting had been convened, called upon the Secretary to read the report.

The Report for 1869 was then read.

It was moved by Mr. STEPHENS, seconded by Mr. ABBOTT, and carried, " That the Report be adopted and printed for circulation amongst the Fellows."

Mr. J. W. GRAVES moved a vote of thanks to Dr. Agnew for the very careful and elaborate Report he had drawn up, and he supported the motion by some eulogistic remarks on the services rendered by the Hon. Secretary.

Mr. F. ABBOTT seconded, and the motion was unanimously agreed to.

Dr. AGNEW acknowledged the compliment and said he needed no thanks for what he had done ; he should at all times be ready to exert himself to further the interests of the Society. He referred to the testimonial which the last annual meeting requested him to procure, and reported that when he was in Melbourne, he endeavoured to select something to the value of the sum subscribed. The testimonial which he procured had been submitted for the inspection of the Fellows, and had, he believed, given general satisfaction to the subscribers.

The meeting proceeded to fill up the four vacancies caused by the retiring members of the Council, Messrs. Justin McC. Browne and A. G. Webster being appointed scrutineers.

The following gentlemen were re-elected:—

VEN. ARCHDEACON DAVIES
HON. A. KENNERLEY, ESQ.
M. ALLPORT, ESQ.
J. W. AGNEW, ESQ., M.D.

On the motion of Mr. BARNARD, seconded by Mr. WEBSTER, Messrs. F. Butler and H. Cook, were re-elected Auditors of annual accounts.

A vote of thanks having been passed to the Chairman, Mr. GIBLIN expressed his acknowledgments, and regretted that the meeting had not been favoured with the attendance of the President, or some Vice-President, as he was of opinion that on these annual occasions there ought to be an address from the chair to the members, as was the case elsewhere.

The meeting then terminated.

⁂

REPORT.

The Session of 1869 was opened on the 9th March, with a paper by F. Abbott, Esq., F.R.A.S., on the late "Transit of Mercury over the Sun's Disc," and the following papers were read at the monthly meetings during the year:—"Remarks on the Geological Structure of Part of the North Coast of Tasmania, with special reference to the Tertiary Marine Beds near Table Cape," by T. Stephens, M.A.; "On the Manufacture of Beet Sugar in New South Wales," by James Barnard, Esq.; "Nobert's test-plate, Moller's Diatom type slide, and Modern Microscopes," by F. Abbott, Esq., F.R.A.S., F.R.M.S. "Net fishing in the River Derwent," by M. Allport, Esq., F.L.S., F.Z.S. "Notes on the occurrence of gold at Port Cygnet," by T. Stephens, Esq., M.A.

Communications to the Secretary, by E. D. Harrop, Esq., F.R.M.S., of Launceston, on the development of the Fasciola hepatica (Sheep Fluke) and on the Phylactidium pulchellum (one of the confervoid Algæ) were also read by permission of the Council.

The Annual Microscopical Soirée was held on the last evening of the Session, and as the Fellows had the privilege of introducing ladies, a very large number of visitors attended, who were both pleased and interested in the examination of the numerous objects collected for their inspection.

The monthly Meteorological Tables have been regularly published, and copies of them forwarded to the Government observatories at Melbourne, Sydney, Adelaide, Brisbane, Perth, Western Australia, and Wellington, New Zealand, from all of which places we receive similar returns.

The published papers of the Society have been as usual forwarded to various scientific Societies and individuals in England, America, the neighbouring Colonies and elsewhere, for which liberal returns have been received, especially from America, both from the Government and from the Smithsonian Institution.

COUNCIL.

No vacancy has occurred during the year. The required list according to Rule XXXII., as amended at the General Meeting of 1868, has been exhibited in the Library for the last fortnight.

FINANCE.

In last year's Report the unexpected reduction of the grant-in-aid was referred to. The necessary consequence of this withdrawal of £50 annually has been the contraction of a debt, as it has not been found possible to carry out stricter economy than has hitherto been exercised. We are happy to say our income from subscriptions and arrears contrasts favorably with that of last year, and as Government (in response to an urgent appeal from the Council) has restored the £50 to our grant, we expect to see the debt very considerably reduced at the end of the current year.

Although the Museum grant has been augmented by £50, we are sorry to say the like sum has been deducted from the Garden grant. This is now only £400; a sum for which it is evident these extensive Gardens cannot be attended to in a manner satisfactory to anyone who takes the slightest interest in their proper maintenance.

Our total income (viz., Government Grant, £150 to Museum, £450 to Gardens; subscriptions £150, and sale of plants, &c., £83 11s. 6d.) has been £833 11s. 6d.; which, with £30 12s. in the hands of the Superintendent of the Gardens for payment of current expenses, and about £40 still due for subscriptions, will give a total of £904 3s. 6d. The total expenditure and liabilities amount to £965 1s., leaving to our debit a balance of £60 17s. 6d.

As will be seen by the Balance Sheet, the debt referred to consists chiefly of accounts due to the London Agents. Of these Messrs. Wheatley's is the usual annual account for current literature; the other is an old-standing account of Messrs. Orger and Meryon, of which we are happy to say one moiety has been cleared off during the last two years, leaving at present only £29 5s. 2d. unpaid.

It is only fair to mention that the expenditure for the year (without considering previous liabilities) has been kept within the income, as will be seen by the following figures:—

	£	s.	d.
Total Receipts from all sources	833	11	6
Total Expenditure	830	9	7
Balance	£3	1	11

GARDENS.

About 400 new plants have been introduced during the past year, embracing many of great interest or utility; as *Rhamnus utilis*, from which is prepared the green dye of China; *Carya tomentosa*, White Hickory or Mocker Nut; *Carya oliviformis*, Pecan Nut; *Thea Assamica*, Assam Tea;

Dactylis cæspitosa, Tussac Grass of Falkland Islands; *Fraxinus pendula aurea*, the Golden Weeping Ash; *Jacaranda mimosæfolia*, and *Jacaranda mimosæfolia alba*; *Dahlia imperialis*, the tree Dahlia which grows to the height of ten or more feet, and is said to be very beautiful when in flower, and *Retinospora ericoides*, from Japan.

Several of the Coniferæ have produced seed for the first time in the colony, during the year. The following are perhaps worthy of especial notice:—*Wellingtonia gigantea*, the mammoth tree of California; *Abies Webbiana*, the purple coned Fir; *Thuja Lobbi*; *Juniperus Langoldiana*; *Pinus muricata*, *pyreniaca*, *Monspeliensis*, and *Montezumæ*.

About an acre of ground has been trenched, and it is purposed to have it thrown open to the public during the ensuing autumn.

Estimated number of visitors for the year, 22,033.

MUSEUM.

Additions have been made to the Conchological collection from various parts of Tasmania, especially the East Coast. To Dr. J. Cox, of Sydney, we are also much indebted for valuable contributions. For the proper display of these and other specimens, which are continually increasing in number, additional case room is much required.

For the exhibition of our stores of wet preparations a considerable outlay (to which our funds are at present unequal) for glass jars and spirits would be necessary.

Specimens of our Fauna, for exchange, have been sent to the Museums of Magdalen College, Cambridge, and Kentucky. Offers of exchange have also been received from some of the Continental (European) collections. It is only due to our former Secretary, Dr. Milligan, to refer to the valuable collection of Tasmanian plants presented by him, arranged and scientifically named by Dr. Hooker, of Kew.

As will be seen by the list of donations many additions have been made to the Geological Museum, all of which have been arranged in their appropriate sections; and the general collection has also received many specimens of Birds, Reptiles, Fishes, &c., with other objects of interest. Several skeletons of indigenous animals have been prepared, and will shortly be articulated and mounted for exhibition.

The Museum has been visited by 12,960 persons during the year. This number is almost double that of any previous year—a circumstance to be attributed in a great degree to the interest excited by the exhibition of the salmon smolts caught in October and December last.

STATEMENT of the Funds of the ROYAL SOCIETY for the Year 1869.

RECEIPTS.	£	s.	d.	£	s.	d.
Annual Subscriptions from 69 Members	103	10	0			
Arrears of ditto	46	10	0			
Total Royal Society				150	0	0
MUSEUM—Grant-in-aid from Treasury	150	0	0			
Total Museum				150	0	0
BOTANIC GARDENS—Proceeds of Sale of Plants, Fruit, &c.	83	11	6			
Grant-in-aid from Treasury	450	0	0			
Total Botanic Gardens				533	11	6
14th Jan., 1870.—Balance overdrawn at Commercial Bank				82	4	4
				£915	15	10
Note.—Dr.—To overdrawn Balance at Bank	82	4	4			
Balance of account due to Messrs. Orger & Meryon, London	29	5	2			
Messrs. Wheatley & Co. account to 31st December (not received), estimated at..	20	0	0			
Total				131	9	6
Cr.—By Cash in hands of Superintendent, Botanic Gardens	30	12	0			
Subscriptions due..	40	0	0			
Total				70	12	0
Balance to Debit				£60	17	6

EXPENDITURE.	£	s.	d.	£	s	d.
Balance overdrawn at Commercial Bank, as per statement for 1868				85	6	3
Interest on overdrawn account 1869, as per Bank Book				6	8	7
ROYAL SOCIETY—Meteorological Instruments	2	0	0			
Printing, Advertising, &c.	32	11	11			
Postage, Parcels, &c.	3	5	1			
Collector's Commission, on Subscriptions received, £150 at 5 per cent.	7	10	0			
Messenger for delivering Papers and Proceedings ..	1	0	0			
Library—Books and Stationery	47	7	3			
Total Royal Society				93	14	3
MUSEUM—Salary of Curator	125	0	0			
Wages of Attendant	52	0	0			
Premium of Insurance	6	7	6			
Purchase of, and preparing Specimens	2	12	6			
Water Rate	3	3	0			
Fuel and Light..	3	9	7			
Sundries and Petty Cash	1	0	3			
Camphor, Spirits of Wine, &c.	8	11	0			
Freight and Carriage of Specimens..	0	14	6			
Fittings, Repairs, &c...	5	1	1			
Ironmongery, &c.	2	14	8			
Total Museum				210	14	10
BOTANIC GARDENS—Salary of Superintendent	150	0	0			
Wages of Foreman and Labourers..	275	19	0			
Tools and Repair of ditto	6	14	1½			
Freight and Carriage of Plants	6	2	8			
Stationery and Postage	2	7	2			
Forage	22	10	0			
Ironmongery, &c.	21	2	1			
Flower Pots	7	5	0			
Sundries..	24	1	8½			
Repairs to Buildings	2	0	3			
Seeds	1	10	4			
Total Botanic Gardens				519	11	11
				£915	15	10

Audited and found correct, February 23rd, 1870,

FRANCIS BUTLER, } *Auditors.*
HENRY COOK,

BOOKS PURCHASED & PRESENTED DURING 1869.

[*Presentations marked thus.**]

Anthropological Society, Memoirs of, Vols. 1 and 2.
*———, Works published by, in 1864-5, 4 Vols.
*———, Catalogue of Books in Library of, 1869.
*———, List of Fellows, 1867.
*Anthropological Review. Nos. 2 to 22. From the Society.
*———Astronomical Register, Nos. 69 to 79. From F. Abbott, Esq.
*———Observations made at Williamstown, Victoria, in 1861-2-3. From Victorian Government.
*Acid, Hydrofluoric, on, by G. Gore, F.R.S. From the author.
Athenæum, The, Parts, 490 to 501, October 1868, to September, 1869.
Arts, Journal of Society of, Vol. 16, Nos. 833 to 844, Vol. 17, Nos. 845 to 884. November 6th, 1868, to October 29th, 1869.
Arts, Transactions of Society of, Vol. 16, bound, 1867-8.
*Association, British, Report of, 1867, bound.
*Agricultural Society of New South Wales, Journal of, Vol. 1, Nos. 6 to 12 ; Vol. 2, Nos. 1 to 4. From the Society.
*Builder, The, Nos. 212 to 225. August, 1868, to September, 1869.
*Boundary Line of New South Wales and South Australia, Determination of. By C. Todd, Esq. From the author.
Botanical Works of the late Robert Brown. Vols. 2 and 3.
*Botanical Discoveries in Australia. Pamphlet by W. Woolls, F.L.S. From Mr. S. H. Wintle.
*Beet Sugar, Manufacture of. MS. By J. Barnard, Esq. From the author.
Conchologia Iconica. Parts 274 and 275 to 280 and 281.
*Colonial Publications, viz., " Derwent Star," 1810; six Government orders, 1814 ; promissory note, value 3d., 1824. From F. A. Moore, Esq., Mangalore, Bridgewater.
*Catalogue of Surgical Section, United States Army, Medical Museum. From Government of United States.
*Exhibition, Intercolonial, 1869 (Sydney), Catalogue of. From J. Barnard, Esq.
*Electrograph Pendulum, Description of. By L. R. J, Ellery, Esq., Melbourne Observatory. From the author.
Florist and Pomologist, Nos. 11 to 22. November, 1868, to October, 1869.
*Flora Capensis, Vols. 1, 2 and 3. From Dr. Sonder, Hamburg.
*Fossilen Mollusken. by Dr. M. Hornes. From ditto.
*Fluke Sheep, The, on development of, by E. D. Harrop, Esq., F.R.M.S. From the author.
Gardeners' Chronicle, Nos. 45 to 52, November 7th to December 20th, 1868 ; Nos. 1 to 44, January 2nd to October 30th, 1869.
*Geological Structure of part of North Coast of Tasmania, By T. Stephens, Esq., M.A. From the author.
*Gold, on the occurrence of, at Port Cygnet. By the same. From the author.
*Intelligencer, Walch's Literary, monthly.
Journal, Practical Mechanics. Parts 44 to 55, November, 1868 to October, 1869.
*Journals of House of Assembly, Tasmania, Vols. 5, 8, 12, and 16. From Government.
*——— of Legislative Council, Vol. 4. From ditto.
Journal, Quarterly of Science, Nos. 21 to 24, January to August, 1869.
Journal of Science, Silliman's American, Vol. 46, No. 138, to Vol. 49, No. 143,
*Law, Reign of, Argyle's. From Dr. Milligan.
Magazine, Country Gentleman's, Vol. 1, No. 5 to 9 ; Vol. 2, Nos. 10 to 12. Vol. 3 Nos. 13 to 16, November, 1868, to October, 1869.
*Mining Surveyors and Registrars, Victoria, Report of 31st December, 1868. From Government of Victoria.
Magazine of Science and Art (Sydney), Vol. 2, 1859.

*Meteorological Observations made at Hobart Town by F. Abbott, Esq., F.R.M.S., &c. Monthly Tables for 1869.

*——————————Port Arthur, from J. Boyd, Esq., ditto, ditto, ditto.

*——————————Swansea, from Dr. Story, ditto, ditto.

*——————————Westbury, from C. Belstead, Esq., ditto, ditto.

*—————————— from King's Island, Swan Island, Goose Island, Kent's Group, Mount Nelson, and South Bruni. From the Hobart Town Marine Board.

*Meteorological Observations, New Zealand, printed tables January to October, 1866 : Report 1868 ; Observations 1868. From Government of New Zealand.

——————————, Brisbane, January to July 1869, monthly tables; Summary for 1868. From Government of Queensland.

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*——————————, Melbourne, ditto April to December, 1869, From Government Observatory.

*——————————, Adelaide, ditto for December, 1868.

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*New Zealand, Abstract Report of Geological Survey of, 1868–9. From N.Z. Government.

*Nobert's Test Plate, &c., by F. Abbott, Esq., F.R.A.S., F.R.M.S. From the author.

*Net Fishing in the River Derwent, by M. Allport, Esq., F.L.S., F.Z.S. From the author.

*Proceedings of Royal Society, London, Vol 16, Nos. 95 to 104 ; Vol. 17. Nos. 105 to 113 ; Vol. 18, No. 114. From the Society.

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*——————— Essex Institute, Salem, Massachusetts, U.S.A., Vol. 4 ; and parts 1 and 2, Vol. 5.—Naturalists' Directory, No. 1.

*American Philosophical Society, Philadelphia, Vol. 10, No. 76.

*——————— American Academy of Arts and Sciences, Boston, U.S., Vol. 6.

*Phylactidium pulchellum—On growth and development of, by E. D. Harrop, Esq., F.R.M.S.

*Report of Mining Surveyors, &c., Victoria, to 30th September, 1869. From Victorian Government.

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———, Inaugural, of Cincinatti Observatory, June 1868.

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Student, The, Nos. 10 to 21, Nov. 1868, to Nov. 1868.

*Society, Royal Geographical, London, Proceedings of, Vol. 12, Nos 2 to 5 ; Vol. 13, No 1, and slips of meetings.

—————————— Journal of, Vol. 37, 1867.

*Society, Linnean, Journal of, Vol 9, No. 40 ; Vol. 10, Nos. 41 to 45, (Zoology) Vol. 9, No. 44 ; Vol. 10, Nos. 45 to 48,—Vol. 11, No. 49, (Botany).—From the Society.

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*———, Royal Asiatic, Journal of, Vol. 3, Parts 1 and 2. From the Society.

*Society, Zoological, of London, Proceedings of, Parts 2 and 3, May to December, 1867, March to June, 1868.
*———,————, Index to Proceedings, 1848 to 1860.
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*——— ————, Memoirs of, Vol. 1, Parts 1 and 2.
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*Statistics of New Zealand, 1867 and 1868. From N. Z. Government.
*———— of Victoria for 1867 and 1868; general index to ditto. From Victorian Government.
*Survey, Geological, of Victoria, Maps, 1 vol. From Sir Robert Officer.
*Smithsonian Institution, Washington, United States, Report for 1865. From the Institution.
*———— Contributions to Knowledge, Vols. 6 and 7. From the same.
*Tasmanian Industries—Pamphlet by J. E. Calder, Esq. From the Government.
*Transits of Venus in 1774 and 1882, Observations on. By G. B. Airey, Esq., Astronomer Royal. From the author.
*Transactions of New Zealand Institute, 1868. From the Institute of Institution of Engineers in Scotland, Vols. 1 to 12 (1857 to 1868.) From the Institution.
*———— of Philosophical Society of New South Wales, 1862-5. From the Society.
*———— of Society of Naturalists, Hamburg. From the Society.
Vertebrata, Structure and Development of Shoulder Girdle and Sternum in. By W. K. Parker, Esq., F.R.S. (*Ray Society's Volume for* 1867.)

LIST OF OBJECTS PRESENTED TO THE MUSEUM DURING 1869, WITH NAMES OF DONORS.

Allport, M., Esq., F.L.S., F.Z.S.—Gelatinous tube of Salpa, and small Crustacean found within it. From Adventure Bay. Two fish, name unknown, caught at Wedge Bay.

Aubin, F., Esq.—A Sun-Fish (*Orthagoriscus sp.*), from Spring Bay.

Bennett, Dr.—A Crab from Sandy Bay.

Bilton, H., Esq.—A double head of Calf. Curious growth of root of tree.

Barnard, J., Esq.—A Package of Seed of Sugar Beet for distribution. Specimens of Cinnabar ore from the Cudgegong, New South Wales.

Bomford, F. E., Esq.—Specimens of Fluke (*Distoma sp.*) from Liver of a Shark.

Buckland, Mrs. J. R.—A Bullet from a double-barrelled gun, found loaded, on the 30th May, 1859, by the side of two skeletons belonging to the retreating party of Sir John Franklin's expedition, in a boat on the west coast of King William's Island, lat. 69deg. 8min., N., long. 99deg. 24min., W. [Vide "Fate of Franklin and His Discoveries," by Captain McClintock, page 294.] A portion of a Boat's Ensign, belonging to the same expedition, left at the Northern Cairn, Cape Felix, May, 1847, and discovered May, 1859, by Lieut. Hobson, of Lady Franklin's screw yacht Fox. A portion of the Riband of the Order of the Redeemer, of Greece, worn by the late Sir John Franklin. An Almond from the Convent Garden on Mount Sinai.

Cox, Dr. J., Sydney.—Sixty-seven specimens of Shells. A large number of Shells from various parts of the world.

Castray, L. R., Esq., A.C.G.—A letter in the New Zealand language, addressed by one native to another, with translation. Six specimens of Woods from Madagascar.

Castray, Miss.—Leaves of Silver Leaf Tree, from Table Mountain, Cape of Good Hope; a Damara Lady's Necklace, from South Africa.

Clifford, Mr. G. P., Dunedin.—Two Limestone Boulders *(Septaria)* from Moeraki Beach, New Zealand

Dyer, Mr. R. T.—An albino variety of the Rosella Parrot (*Platycercus eximius.)*

Dear, Rev. R. E.—Specimens of Iron Ore and laminated Quartz. A number of stone implements of the Aborigines collected by Mr. Rollings, of Forcett.

Dinham, Mr. G.—Two Fossil Shark's Teeth from the Lias, near Bath, England.

Edwards, Miss S. P.—Specimens of Salpa found at sea on the passage from England. Eleven Copper Coins and Tokens.

Exton, Mr. W., Oatlands.—An Owl *(Strix castanops.)*

Edgar, Mr. J. C., Sorell.—Seven specimens Land Shells.

Ferguson, P., Esq.—A Letter of the Chetty Merchants *(Tamils)*, of Southern India and Ceylon, with an explanatory note.

Gooch, Mr. G, F.—A small Silver Coin.

Gellibrand, W. A. B., Esq.—A female specimen of the native Tiger (*Thylacinus cynocephalus).* Photographs of Machinery in Leeds Exhibition.

Gates, Mr., Jerusalem.—A Black Cockatoo.

Glover, Mr.—Fifteen Geological Specimens from West Coast of Tasmania.

Guichard, M. H., ship La Somme.—One Bronze Coin, five cents; one Silver ditto, five cents, Napoleon III., 1862.

Garth, Captain.—An Albatross (*Diomedia exulans.)*

Hannaford, S., Esq.—Specimen of Sipunculas from Corio Bay, Geelong. An Ostracion. Two Seeds of Trappa Bicornis from China.

Heron, M. C., French ship La Somme.—Two copper coins, colony of Cayenne, Louis XVI., 1789. One ditto Republic of Berne, 1796.

Hull, H. M., Esq.—A Key-hole Limpet; a Chiton; a Magpie Perch; a Malay Kris; three small Fish.

Hedberg, Mr. Oscar.—A collection of Shells from East Coast of Tasmania.

Holmes, Mr. F.—Portion of Skin of Whale tanned.

Harrop, E. D., Esq., Launceston.—Four mounted specimens of Sheep Fluke *(Fasciola hepatica.)*

Hull, J., Esq.—A Falcon *(Falco melanogenys).*

Johnston, W., Esq., Trinity Hill.—A Boomerang and Waddie from Queensland; a Spear from New Hebrides; a large Seed, said to have been taken from the stomach of a Barracouta; four Coins, and one Brass token.

Jones, Mr. J.—A small Turtle from Lady Elliott's Island.

Kelly, Mr. J.—A Shilling of Queen Anne, 1707, and a Danish Coin, 1771. A Brass Basin (Indian).

Knight, Mr. W., jun.—A collection of Geological Specimens brought by Mr. Glover from the western coast of the Island.

Krefft, G., Esq., Sydney Museum, per M. Allport, Esq.—Five Bird Skins from King George's Sound.

Legrand, Mr.—Specimens of new species of Helix *(Helix Allporti.* Cox.) Two ditto of *Bulimus Tasmanicus.*

Luttrell, Mr. G.—Shell impressions from Port Cygnet.

Milligan, Dr., London.—Seven packages dried Tasmanian Plants, named by Dr. Hooker. Two ditto of Italian plants. Six specimens of *Calymene Blumenbachii* from Wenlock Shale, Gotland. Specimen of Esparto Grass, for paper making.

McLaren, Mr.—A cluster of Barnacles from piles of wharf.

Manley, Miss S. A.—Four specimens of *Chamostrea* from Carlton beach.

Maclaine, J., Esq., Clarke's Island.—An Avocet *(Recurvirostris rubricollis.)*

Meredith, Hon. C., Esq.—Two specimens of Silver Fish from Prosser's Bay.

Meredith, Mrs. C.—Specimen of Australian Coot *(Fulica Australis,)*

McRa, Mr. H.—Three Geological Specimens from Bothwell. A stone implement of the Aborigines.

Mitchell, Mr., Sandy Bay.—A Basket and Necklace made by Aborigines of Tasmania.

Maclanachan, J., Esq.—A Hen Golden Pheasant. A Pheasant (a cross between English and Chinese varieties.) One ditto.
Maning, A. H., Esq.—A Sun Dial made and used by Spanish shepherds.
Nichols, Captain T.—Skeleton of a Fish from Howe's Island.
New, Mrs.—A Brown Trout *(Salmo fario)* caught in the Bagdad Creek.
Officer, Sir R.—A White Hawk.
Propsting, R., Mr.—A Swamp Hawk *(Circus assimilis.)*
Peck, Miss.--An English Barn Owl *(Strix flammea)*, prepared and mounted.
Rollings, Mr., Sorell.—A Jade Chisel from New Zealand. A stone implement used by Tasmanian Aborigines for skinning Kangaroo, &c.
Ransome, Mr. R., Southport.—Specimen of Felspar Porphyry, and the ear-bone of a Whale.
Ransley, Mrs.—A Lizard with double tail.
Rossitor, Mr.—Specimen of the Maori Hen of New Zealand. An English Partridge. Three bones of foot of Moa *(Dinornis sp.)*
Roblin, Mr.—A Black Cockatoo *(Calyptorhynchus xanthonotus.)*
Room, Mrs., Launceston.—A half Rupee.
Roberts, Captain.—A Snake and three large Centipedes.
Swan, J., Esq.—Skeletons of Forester and Brush Kangaroo.
Swan, E. D., Esq.—Polished specimen of Fluor Spar from Derbyshire, England.
Salmon Commissioners.—A Salmon Smolt caught in the Derwent.
Stagg, Mrs.—Eight Limestone Fossils *(Tasmanian.)*
Stephens, T., Esq.—A Kingfisher *(Alcyone sanctus)* from Southport.
Swift, Mr. A. H., Little Taylor's Bay.—Two specimens of Hæmatite from Point Ventinat.
Swan, E. D., Esq.—Nest and egg of *Epthianura albifrons* from Cornelian Bay.
Story, Dr., Swansea.—Skeletons of Wedge-tailed Eagle, Crane, Bandicoot, &c.
Seymour Coal Company.—Slab of Shale with plant impressions, from Seymour Mines. Specimen of Coal from West Wanganui Inlet, New Zealand.
Taylor, Mr. A. J., New Norfolk.—A Copper Coin of French Republic.
Townsend, Mr. J.—Specimens of calcareous incrustations on roots of plants, from sandy beach at Pittwater.
Thomas, Mr. W. J.—A large specimen of Native Bread *(Mylitta Australis.)*
Turner, Mr. H.—An Irish Penny, and a Sydney token.
Wintle, Mr. S. H.—A vegetable impression in Shale from Mount Wellington *(Endogenophylites Wellinglonensis.* McCoy.) A cluster of plant impressions from Claystone. Fragments of Shale with impressions of plants, from New Town. Specimen of *Pholas* from Sandy Bay. A Gall Fly and nest; also a smaller species with its larva. Seventeen named specimens of Tasmanian Coleoptera. Specimen of Cleithelepis from New South Wales, discovered by the Rev. W. B. Clarke. A mineral specimen from the Mudstone, Huon Road.
Whitely, Mr.—A Silver Coin, 10 cents, Netherlands, 1849.
Walch, Mr. J. H. B.—A Shilling of Queen Elizabeth; a Farthing of George II., 1741; a Copper Coin of French Republic (L'an 5); ditto of one of the Roman Emperors.
Whitcomb, G., Esq.—Samples of Coal from Lambton Colliery, Newcastle, and Bituminous Shale from Hartley, New South Wales. A sample of Sugar Cane grown in Queensland.
Wilkinson, F. B., Esq.—A Mountain Duck *(Casarca tadornoides)*.
Williams, Captain.—Sample of Mineral Water, from Spring Bay. Tail of Tunny.
Young, Mr. J.—Eight specimens of Crustaceans.

PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING 1869.

February 10th.—From the Acclimatisation Society, Christchurch, New Zealand.—Two packets Seeds.
February 20th. – From Mr. C. F. Creswell.—Nine packets Seeds, eleven species tuberous plants received from England.
March 2nd.—From Mr. C. F. Creswell.—Eighteen first-class new Dahlias.
April 5th.—From Mr. T. C. Wren, Mount Hobson Nursery, Remuera, New Zealand.—One Case containing 24 plants.
April 5th.—From the Melbourne Botanic Gardens.—One Case containing 14 plants.
June 15th.—From Mons. Verschaffelt, Ghent, Belgium.—One Case containing 48 plants, of which 33 were alive and 15 dead; one Bundle containing 106 varieties fruit, of which 43 were alive and 63 dead.
June 25th.—From Mr. G. Brunning, St. Kilda Nurseries, Melbourne.—One Case containing 60 plants.
June 25th.—From Mr. Joseph Harris, South Yarra Nurseries, Melbourne.—One Case containing 47 plants.
June 25th.—From the Melbourne Botanic Gardens.—One Case containing 29 plants.
July 14th.—From Mr. E. B. Heyne, Seedsman, Adelaide.—28 packets seeds.
July 16th.—From Mr. S. Clifford, Dunedin, New Zealand.—Five plants Cyathea.
July 21st.—From the Ven. Archdeacon Davies.—Twenty-two varieties Pelargonium seed.
July 27th.—From Mr. James Jones, Melbourne.—Two packets seeds.
August 20th.—From the Melbourne Botanic Gardens.—One Case containing 18 plants.
September 4th.—From Messrs. Taylor and Sangster, Toorak Nurseries, Melbourne.—One Case containing 16 plants.
November 10th.—From Mr. Robert Young, Gipps Land.—One packet Pittosporum seed.
November 23rd.—From Mr. C. F. Creswell.—Six packets seeds.
December 21st.—From Joseph Milligan, Esq., London, favoured by Captain Lulham.—48 packets seeds.
December 24th.—From Messrs. Taylor and Sangster.—One Case containing 59 plants.

PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1869.

February 27th.—To Mons. A. Verschaffelt, Ghent, Belgium.—One packet Seeds.
March 24th.—To the Melbourne Botanic Gardens.—Lot Box Cuttings.
March 30th.—To the Sydney Botanic Gardens.—One Case containing 40 plants.
May 8th.—To J. W. Newman, Esq., Adelaide.—One Box containing 25 plants.
May 25th.—To Mr. Joseph Harris, Nurseryman, Melbourne.—One Case containing 44 plants and 26 papers seeds.
May 26th.—To Messrs. Taylor and Sangster, Toorak Nurseries, Melbourne.—Thirty-six varieties Bulbs.
June 16th.—To Mr. G. Brunning, St. Kilda Nurseries, Melbourne.—One Case containing 54 plants and 12 packets seeds.
September 9th.—To Messrs. Taylor and Sangster, Toorak Nurseries.—Nine packets Conifer Seeds.
September 28th.—To Mr. S. Clifford, New Zealand.—One Case containing 25 plants.
December 20th.—To the Sydney Botanic Gardens.—One Case containing 40 plants.

PLANTS SUPPLIED FOR THE DECORATION OF PUBLIC PLACES DURING 1869.

For Government House Grounds.—Ninety plants.
For decoration of the grounds of Cascade Invalid Depôt.—Forty Cypress plants, eighty Trees and Shrubs, and thirty six Herbaceous Plants.
For the grounds of Church of England, Campbell Town.—Thirty-six plants.
For Castray Esplanade.—Seventy plants.

F. ABBOTT, JUN.,

Superintendent R. S. Gardens.

PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1869.

Alseuosmia quercifolia
Anemone apennina
,, fulgens
,, Narcissifolia
Aralia Sieboldtii
Aristolochia gigantea
Asclepias Douglassii
Bellevalia ramosa
Bobartia aurantiaca
Bomaria multiflora
Buxus latifolius
Caloscordium nerinifolium
Campanula Elatineæ
,, Hoheneckeri
Carya oliviformis
,, tomentosa
Cestrum Palqui
Chelone barbata Torreyi
Chorizema diversifolia
,, soulangeana
,, spectabilis
Citriobatus microphyllus
Claytonia perfoliata
Corokia buddleoides
Cotoneaster laxiflora
Cosmus bipinnatifidus
Crocus chrysanthus
,, nivalis
Cummingia bulbocodium
Cuphea purpurea Kermessina
Cussonia thyrsiflora
Dactylis cæspitosa
Datura fastuosa Huberiana
Dahlia imperialis
Delphinium Madame Rougiere
,, Queen of England
Dianella Media
Draba Bætica
Ehretia acuminata
Enothera Drummondi nana
Epimedium alpinum
,, grandiflorum
,, pinnatum
Erica baccans
,, calycina major
,, Margaritacea
,, persoluta
,, Plukenetii
,, tetralix
Erica tubiflora
,, vulgaris
,, Willmoreana
Esculus rubro atrosanguinea
Fraxinus pendula aurea
Galanthus plicatus
Galaxia Germanica
Gentiana lutea
Gesnera Princei
Gossipium Sturtii
Habranthus Andersonii
Hepatica angulosa
Hoheria populnea
Hydrangea japonica
Ipomæa filicifolia
Iris reticulata
Ismene sp.
Jacaranda digitaliflora
,, digitaliflora alba
Jasione humilis
Jubæa spectabilis
Lilium Takesume
,, testaceum
Linaria alpina
,, tripartita superba
Lobelia Cardinalis Q. Victoria
,, fulgens purpurea
Melicytus lanceolatus
Merendera bulbocodium
Mesembryanthemum Tegens
Narcissus juncæfolius
Ornus rotundifolius
Oxalis tropæoleoides
,, valdaviana
Passiflora Jumbo
Pentstemon glabra
,, Lobbi
Phenocoma prolifera
Pithocolobium umbrosum
Pinus patula
Pimelia diosmæfolia
Plagianthus Lyalli
Podocarpus dacrydioides
Polygonatum verticulatum
Prunus sinensis rosea
Psidium album
Retinospora ericoides
,, plumosa
Rhabdothamnus Solandri

Rhamnus utilis
Sagus ruffia
Saxifraga Fortunii
Scilla umbellata
Scizostylis coccinea
Sericographis Ghiesbrightiana
Silene alpestris
Solanum acanthocarpum
Spiræa umbrosa
Swainsonia Greyana carminea
Syringa Charles X.
Taxodium Sinensis
Terminalia Bellerieri
Thea Assamica
,, viridis
Thujaopsis lætevirens
Tydea venosa
Ulmus campestris aurea variegata
Ulmus Montana Vegeta
,, Sinensis aureus variegatus

FERNS.

Adiantum Cunninghamii
,, Capis veneris
,, formosum
,, nigrum
,, pubescens
Aneimia fraxinifolia
Aspidium molle
,, Sieboldtii
Asplenium Adiantum nigrum
,, attenuatum
,, ebenum
,, falcata
,, flabellifolium
,, flaccidum
,, laxum
,, trachominoides
Blechnum Braziliensis
,, gracile
Cyathea medullaris
,, dealbata
Davallia canariensis
,, Giberosa
Diplazium Twaitsii
Doodia aspera
,, caudata
,, caudata confluens
Gleichenia microphylla
Gymnogramma sulphurea
Leptopteris hymenophylloides
,, superba
Lomaria Pattersonii
,, pumila
Lycopodium cæsium violaceum
,, umbrosum
Lygodium articulatum
Maraltia salicina
Niphobolus lingua
,, rupestris
Pellæa rotundifolia
Platyloma falcata
Polypodium angustifolium
,, glaucum
,, paradasiaca
,, vaceolens
Pteris cretica
,, cretica alba lineata
,, japonica
,, longifolia
,, pinnata
,, rotundifolia
,, scaberula
,, semipinnata
Scolopendrium officinarum
Trichomanes elongatum
,, reniforme
Zinniscium serratum

TREE PÆONIES.

Pænia Moutan Avocat Guillon
,, Cardinel Antonelli
,, Dyonidii
,, George Rollison
,, Germanica
,, lactea
,, Mde. Guidebach de Raes
,, odorata plenissima
,, papaveracea fimbriata
,, papaveracea albo pleno
,, Professor Morren
,, Victoria Superba

ROSES.

Achille Gonad
Alfred Colomb
Alpaide de Rolatier
Beauty of Waltham
Countesse de Barbautaume
Evêque des Nismes
François Lacharme
Heroine Vaucluse
John Keynes

La Duchesse de Morny
Louis XIV.
Madame Roussett
Marguerite Bonnet
Model of Perfection
Prince Leon
Princess Mary of Cambridge
Princess of Wales
Rushton Radcliff
Souvenir de W. Wood
Senateure Favre

PELARGONIUM.

Belle of the Ball
Fantastic
Fair Rosamond
High Admiral
John Hoyle
Magnet
Rosa Bonheur
Royalty
Regularity
The Prince

GERANIUM.

Arab
Autocrat
Beauty of Europe
Clio
Crystal Palace Gem
Crimson Queen
Cybister
Dr. Hogg
Enchantress
Ephraim
Excellent
Gaiety
Gloire de Nancy
Golden Pheasant
Jason
Luna
Legrand
Mangle's silver variegated
Model
Monte Rosa
Prince Imperial
Purple Queen
Rival Stella
Sambo
St. George
Triumphans
Triumph de Lorraine
Waltham Nosegay

FUCHSIA.

Arabella
Bland's florabunda
Conquest
Diadem
Favourite oi Fortune
Lady Heytesbury
Mrs. Gladstone
Rose of Denmark

VERBENA.

Beauty
Daylight
Empress
Ensign
Eugenie
Gipsy Queen
Lion Hunter
Mary Ann
Miss Mary Law
President
Queen Victoria
Ringleader

DAHLIA.

Andrew Dodds
Angelina
Bessie
Chairman
Constance
Caroline Tettrell
Chameleon
Compacta
Delicata
Flower of the Day
Golden Pheasant
Grand Sultan
Hebe
Lady Derby
Leopardess
Lord Derby
Lord Fielding
Memorandum
Miss Manners-Sutton
Miss Turner
Mrs. Crisp
Mrs. Dodds

Mrs. Piggott
Mont Blanc
Nora Creina
Princess Radcliff
Prince of Russia
Purple Gem
Queen Mab
Queen of Whites
Rosy Queen
Summertide
Sparkler
Sir Greville Smythe
Tiffany
Viceroy
White Standard
Wonderful

APPLES.

Annat Scarlet
Beauty of Wilts
Blenheim Pippin
Bull's Golden Reinette
Çoccageȩ
Ingestrie Yellow
Lodgemore Nonpareil
Magnum Bonum
Nelson's Codlin
Nonsuch Paradise
Pine Apple Russet
Prizetaker
Rick's Nonsuch
Rosemary Russet
Striped Beaufin.

PEARS.

Bell de Bruxelles
Kingsessing
Trillington

PLUMS.

Early Prolific
Guthrie's Late Green
Siegel's Apricot

STRAWBERRY.

Cockscomb

F. ABBOTT, JUNR.,

Superintendent R. S. Gardens.

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Errata.

Page 12.—End of third, and beginning of fourth line for "**Elæorarpus,**" read "Elæocarpus."

Page 12.—Last line, for "desv. Journ. Bot.," read "**Desv. : journ. Bot.**

Page 14.—Third line of third paragraph, for "Pterygapappus," read "Pterygopappus."

Page 14.—Ninth line of ditto for "Ptorygopappus," read "Pterygopappus."

Page 20.—First line of second paragraph, for "Gunii," read "Gunnii."

Page 32.—Third and fourth lines of paragraph beginning No. 8, for "Chironectes," read "Cheironectes."

Page xxv.—Second line of heading, for "1820," read "1870."

Page xxvii.—Ninth line below table, (Barometer Mean,) for "29.813 in.," read "29.863 in."

Page xxx.—Last line of table, Barometer Mean, for "29.877," read "29.887."

Page xxxii.—Fifth line, Barometer Mean, for "29.819 in.," read "29.879in."

ROYAL SOCIETY.

◆

MARCH, 1870.

The first monthly evening meeting of the session was held on Tuesday, the 8th March, J. Barnard, Esq., in the chair.

The Secretary, Dr. Agnew, laid on the table the following returns:—

1. Visitors to Museum during January and February, 1836.
2. Ditto Gardens ditto, 3687.
3. Time of leafing, flowering, and fruiting of a few standard plants in Society's Gardens during February.
4. Tench supplied from pond in Gardens during February, 12.
5. Books and Periodicals received in January and February.
6. Presentations to Museum since last meeting.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.,—tables for January and February.
2. Port Arthur, from J. Boyd, Esq.,—table for January.
3. Swansea from Dr. Story,—ditto for December and January.
4. Westbury, from C. Belstead, Esq.,—ditto for January and February.
5. New Zealand, from the Government,—ditto for November and December.
6. Brisbane, Queensland, from E. McDonnell, Esq., Government Observer,—tables for October, November, and December, 1869.

The presentations to the Museum were as follow:—

1. From Miss H. Mayson and Miss J. Mitchell—A collection of Shells from East Coast of Tasmania.
2. From J. T. Leake, Esq., Campbell Town—A specimen of Roman Brick from St. Albans, England (the ancient Verulamium).
3. From the Very Rev. Archdeacon Marum, per Dr. E. S. Hall—A collection of Fossils from neighbourhood of Dromedary Mountain.
4. From Mr. O. H. Hedberg—A collection of Swedish Coins and Notes.
5. From Mr. Dinham—Two stone Hatchets made by Aborigines of Australia and Tasmania. Portions of Skull, &c., of Aborigine dug up at Mona Vale, Tasmania. A fossil Seed from the sandstone, Somersetshire, England, found 80 feet below the surface.
6. From Mrs. S. Crouch—A collection of weapons, &c., from Fiji and Samoa, viz.:—One Fijian Pillow, two pieces Tappa cloth, one female Fijian chief's Dress, one Paddle, two War Clubs, one piece Samoan Cloth, one Sandwich Island Spear, one Spear, Skull of Porpoise, Fœtal Porpoise.
7. From Mr. M. Weber—A War Club from Fiji.
8. From J. W. Graves, Esq.—Two skulls of Axis Deer from Slopen Main.

[These deer were bred from those imported by Sir W. Denison from the Lower Ganges, and turned loose on Tasman's Peninsula.]

9. From Mr. Fencker—Four specimens of auriferous quartz from the Pioneer Reef, Lyndhurst (Waterhouse).
10. From W. A. B. Gellibrand, Esq.—A stone Axe from New Zealand.
11. From H. M. Hull, Esq.—A Lizard, 8 Crickets, and two Fish.
12. From J. W. Graves, Esq.—Nest of Sparrow from a gum tree in Mr. Turner's millyard. A Black Snake (*Hoplocephalus curtus*).

[This snake was killed near the upper end of Goulburn-street, Hobart

Town, and measured 4ft. 1in. in length. The light colour of the specimen is due to its having but recently changed its skin when killed.]

13. From Mr. G. Weaver—A Musk Duck *(Biziura lobata)*.
14. From Mr. Luttrell—Specimens of Quartz from Tomahawk River and Pioneer Reef, Waterhouse, that from the latter place being auriferous. Four small Crabs from North Coast.
15. From Mr. D. Chisholm—A large Fungus from a gum tree. Skeleton of young Sting Ray.
16. From Mr. A. Nicholas, per Mr. F. Abbott—A fossil Spatangus from New Zealand.
17. From Mr. R. Propsting—A Swamp Hawk *(Circus Assimilis*—Allied Harrier).
18. From Mr. Geo. W. Rex—The crop of a Fowl containing an entire Whip Snake.

[This specimen was discovered on the fowl being killed, and in course of preparation for the table. The bird had previously presented no unusual appearance, and had received no injury from swallowing the reptile.]

19. From Mr. A. Neilson—A very large specimen of the common Slug, which when alive measured six inches in length.
20. From Mr. F. Smith, Holbrook Place—A large mollusk *(Aplysia sp.)*, from Brown's River.
21. From Mr. R. James—Part of the skeleton of a Ray (?).
22. From Mr. G. J. Smith—Piece of native box wood, with thorns embedded in its substance.
23. From Mr. Exton, Oatlands—A Rail *(Rallus Lewinii)*.
24. From Mr. H. Nelson—Sample of Coal from Greymouth, New Zealand. The seam from which this coal is obtained is said to be 16 feet, in thickness.
25. From Mr. Plunkett, Sandy Bay—A Pair of Mittens made by Esquimaux of Behring's Strait.
26. From M. Allport, Esq—A collection of Insects from Port Arthur.
27. From Mr. Gidley Lewis—A Russian Silver Coin of the Empress Catherine, 1796. Specimen of handwriting of General Moreau.
28. From Mr. R. Pybus, Bruni Island—A 5s. piece of Charles II, 1677.
29. From Mr. W. Cole, Cleveland—One Spanish silver coin, Carolus III., 1781. One United States ditto, ½ dime, 1854. One brass ditto, Louis XVI. of France, 1792. One silver Coin unknown.
30. From H. Hopkins, jun., Esq., a fœtal lamb (a monstrosity.) Two Dories.
31. From the Trustees, Australian Museum, Sydney, per the Hon. E. Deas Thomson, C.B.—Part of skull and upper jaw of fossil Sarcophilus (Devil) from Wellington Caves, N. S. Wales. Eight photographs of *Ceratodus Forsteri*, a fish inhabiting the Burnett River, N.S.W.

[This fish is admirably adapted to many of the streams of the colony, which although comparatively large rivers in the winter season, present only a chain of pools in the summer. The Ceratodus by means of its fins is enabled to travel considerable distances on land, and when a pool in which it may be present is dried up it can thus go in search of another.]

32. From M. Allport, Esq.—Part of skull of Tunny, washed on shore, North Coast of Tasmania.
33. From Baron F. Von. Müeller—Skeleton of a White Swan.
34. From Mrs. Chapman, Macquarie-street—Seeds from Borneo.
35. From Mr. James, Collins-street—Jaw of species of Shark.
36. From Mr. Walter Paisley, Franklin, per Mr. Graves—A Cuttle Fish.

[This interesting Cephalopod belongs to the *Octopodidæ*, and specimens have several times been captured on our coasts. It is very rapacious, and swims with great rapidity by means of its powerful fluke-like tail. Any wounded fish in its neighbourhood are instantly attacked, and the rapidity with which its parrot-like beak cuts into and kills its prey is astonishing. A few years back one of these cuttle fish was exhibited in Hobart Town, and was described by an anonymous writer as belonging to the genus *Onychoteuthis*, but this was undoubtedly an error, as the hook-like processes on the long tentacles, which are the distinguishing mark of the *Onychoteuthidæ*, and from which the name is derived, are absent in this species.]

The only donation to the library was a work by Fleetwood Buckle, Esq., M.D., of H.M.S. Liverpool, on the "Vital and Economical Statistics of the Hospitals, Infirmaries, &c., of England and Wales," presented by the author, per Dr. E. S. Hall.

In reference to the nest of the Sparrow (Presentation No. 12), Mr. Allport remarked, that he was, at first, adverse to the introduction of these birds, but for some time back, he had reason for changing his mind. He found, so far as his observation had as yet extended, that wherever the Sparrow came, it drove away the White Eye *(Zosterops dorsalis)*, a most destructive bird to fruit.

Mr. Graves had a better opinion of the White Eye than Mr. Allport, and had no doubt, that its good qualities were greater than the bad. The benefit which these, and many of our smaller, and comparatively unknown birds conferred on our farms and gardens, by destroying noxious insects, &c., was incalculable. As an addition to our insectivorous birds, he had himself liberated some Canaries, which already had progeny, and if spared by their enemy the cat, would, he thought, become thoroughly acclimatised.

Mr. M. Allport called attention to the presentation of the "Sea Hare" (No. 20), by Mr. Francis Smith (son of the Chief Justice), which is of peculiar interest, as being another example of the manner in which forms of animal life of the lower types are reproduced at opposite ends of the world. The present specimen is of the *Genus Aplysia*, and so closely resembles the English creature *Aplysia punctata*, as to be all but identical —the Tasmanian form being the larger. Its true position amongst the mollusca is beautifully exemplified by the rudimentary shield—like shell which is buried in the tissues of the back, and serves as a guard to the delicate branchial organs of the creature. (This shell, dissected out, was exhibited to the meeting.) Mr. Allport expressed a hope that others of our youth would follow the good example set by Mr. Smith in forwarding to the Museum that which struck him as being new or curious, instead of casting it aside without enquiry, or heed to its scientific value.

Presentation No. 31 is interesting, as proving the former existence on the main land of the larger carnivorous marsupials now found living in Tasmania. In his paper on Mr. Krefft's "Notes on the Fauna of Tasmania," read before a meeting of this Society, Mr. Allport pointed out the probability that the Dingo *(Canis dingo)* had usurped the position of the Tiger *(Thylacinus cynocephalus)* and the Devil *(Sarcophilus ursinus)* on the main land; and that the absence of the Dingo in Tasmania explained their continued existence in the latter colony.

The Secretary read a paper,* entitled "Contributions to the Phytography of Tasmania," by Baron F. Von Müeller, C.M.G., F.R.S., &c. The paper was accompanied by notices of upwards of a hundred plants, many of them hitherto undescribed, observed by the author in the region of Mount Field, &c.

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* This paper is the second on the same subject contributed by Baron Von Müeller, for the first see Trans. Royal Soc. Tasmania for 1868, p. 7.

Mr. Stephens begged to mention in reference to a paper which he brought before the Society in October last, on "The occurrence of gold at Port Cygnet," that he had sent some specimens of the rocks he had found there, and described, to the Rev. W. B. Clarke of Sydney. He would read a few lines from Mr. Clarke's reply, as it was satisfactory to find the theory broached in his paper confirmed by so eminent an authority :—" I see so much in these specimens like rocks I have often found in the gold-fields, and especially like the porphyritic bands that traverse the gold-fields, of the Gilbert River and Gympie in Queensland, and I think there must be a relationship. It would be premature to designate the formation at Port Cygnet geologically, but I agree with you as to its probable great antiquity."

Mr. M. Allport proposed a special vote of thanks to Baron Von Müeller. It was pleasant to find a savant of such world-wide fame, and whose scientific labours are so much greater than we are aware of, communicate so freely with this Society, when so many of our other corresponding members are silent. He would also include in the vote the name of Dr. Hall, to whom on this occasion, and formerly for a period of several years the Society was much indebted for the careful analysis he had given of the meteorological records, in connection with the vital statistics of the colony, which had so much enhanced the value and interest of these tables.

Mr. Davies, after some eulogistic remarks on Baron Von Müeller's labours on behalf of Tasmanian botany, cordially seconded the motion, which was unanimously carried, and the usual vote having been accorded to the donors of presentations, the meeting terminated.

APRIL, 1870.

The monthly evening meeting of the Society was held on Tuesday, 12th April, H. Bilton, Esq., in the chair.

W. A. Guesdon, jun., Esq., who had been previously nominated, was duly elected by ballot as a member of the Society.

The Hon. Secretary (Dr. Agnew) submitted the usual returns for the past month, viz. :—

1. Visitors to Museum, 722.
2. Ditto to Gardens, 1846.
3. Plants, &c., sent from Gardens.
4. Time of leafing, flowering, and fruiting of a few standard plants in Botanic Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and Summary for March.
2. Westbury, from C. Belstead, Esq.—Table for March.
3. Port Arthur, from J. Boyd, Esq.—Ditto ditto.
4. New Zealand, from the Government,—Ditto for January.
5. Sydney, from G. R. Smalley, Esq.—Ditto for November and December, 1869, and January, 1870.

The presentations to the Museum were as follow :—

1. From Captain Williams, a manuscript newspaper, the *Western Australia Gazette*, June 13th, 1830.
2. From Mr. Watson, Brown's River, a kingfisher *(Alcyone azurea)*.
3. From M. Allport, Esq., a Diamond Snake *(Hopolocephalus superbus)*.
4. From Miss Sherwin, a Lamprey, from Brown's River.
5. From T. Giblin, Esq., a Fish *(Clinus sp. ?)* from Risdon.
6. From Captain Dart, of the Sapphire whaler, four Sharks' Jaws, a Crustacean, a small Pilot Fish, and a Native Hen, from Howe's Island.
7. From Captain Forsyth, brig Waverley, a Snake and Lizard, from Java.
8. From J. W. Graves, Esq., a Cape Barren Goose *(Cereopis Novæ Hollandiæ)*.
9. Two small Falcons *(Falco frontatus)*, donor unknown.
10. From W. Knight, jun., Esq., samples of Cinnabar ore, from Cudgegong, New South Wales.
11. From Mr. G. Edwards, Oatlands, a White Kangaroo, an albino variety of *Halmaturus Bennettii.*
12. From C. Degraves, Esq., four Fossils from the limestone at Cascades.
13. From Mr. W. Smith, a Flounder curiously marked.
14. From C. Dinham, Esq., a Collection of Mineral Specimens, &c., from Somersetshire and Cornwall, England.
15. From H. M. Hull, Esq., Specimens of Iron Pyrites and Malachite.
16. From Mrs. Makepeace, Swansea, four specimens of Echinodermata, and the egg cases of *Fasciolaria sp.*
17. From Captain Clinch, the jaws of a species of Shark from Twofold Bay.
18. From Mr. McKenna, a living specimen of *Gordius aquaticus*, from New Town Rivulet.
19. From Mr. J. Young, Howrah, a Spider Crab.
20. From Mr. Docksey, three Mineral Specimens, from Adelaide.
21. From Mr. Roblin, a specimen of *Aplysia sp.*, from Cornelian Bay.
22. From Mr. M. Tapfield, a specimen of Gorgonia, with species of *Astrophyton* attached.

Mr. Abbott read a paper entitled "Some additional observations on changes which have taken place in the Star η Argus, and its surrounding Nebula."

The paper was illustrated by drawings, showing the present appearance of the star and nebula. Drawings of the same by Sir J. Herschel in 1834, by Mr. Abbott in 1863 and 1868, and by Lieutenant Herschel in 1869, were also exhibited, showing in a striking manner the great and inexplicable changes which have taken place within a few years in this very interesting object.

Some conversational discussion having taken place, the usual votes of thanks were accorded to Mr. Abbott and to the donors of the various presentations, and the proceedings terminated.

MAY, 1870.

The monthly evening meeting of the Society was held on Tuesday, the 10th May, J. Barnard, Esq., in the chair.

The undermentioned gentlemen, who had been previously nominated by the Council, were, after a ballot, declared duly elected as members of the Society :—

1. The Rev. Dr. Bleasdale, of Melbourne, as corresponding member.
2. R. P. Adams, Esq., Hobart Town.
3. Frederick B. Walker, Esq., Rhodes.

The Secretary (Dr. Agnew) laid on the table the usual Monthly Returns, viz. :—

1. Visitors to Museum during April, 642.
2. Ditto to gardens ditto, 1,314.
3. Seeds received at gardens.
4. Time of leafing, &c., of a few standard plants in gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq.—Table and summary for April.
2. Melbourne, from R. J. Ellery, Esq.—Tables for Jan., Feb., and March.

The presentations to the Museum were as follows :—

1. From Mr. Edwards, Kewstoke, near Oatlands—A large specimen of Carnelian.
2. From Sir Robert Officer—A Platypus *(Ornithorynchus anatinus)*.
3. From Mr. J. Smith, brig Waverley—A collection of Snakes, Lizards, &c., from China.
4. From Mr. T. Parker—Two specimens of auriferous Quartz from Pioneer Reef, Waterhouse.
5. From T. L. Gellibrand, Esq.—A Wedge-tailed Eagle (*Aquila fucosa*).
6. From Mr. Ballantyne—A curious Fish, caught in the Derwent.
7. From Mr. M. Allport—A Rail (*Rallus Lewinii*).
8. From Mr. Pearsall, Muddy Plains—A Chestnut-faced Owl (*Strix castanops*)
9. From Mr. J. J. Low, Richmond—A Black-cheeked Falcon (*Falco melanogenys*).
10. From Master Ernest Bayley—A Falcon (*Falco frontatus.*)
11. From Mr. Ikin—Two spines from Sting Rays.
12. From Mr. O. E. Hedberg—Jaws of Shark.
13. From Mr. S. H. Wintle—Two specimens of Granite from the Tomahawk River.
    Fossil Ripple marks from Southport.

In reference to the last named presentation the following note from Mr. Wintle was read :—" These fossil ripple marks I obtained from a vertical section of the carboniferous strata at Southport, Tasmania. The shales in which they occur are overlaid by a bed of sandstone 12 feet thick. Underneath the smallest ripple marks I found a beautiful fossil impression of *Glossopteris angustifolia* (McCoy). The cliff is one of great geological interest."

The following list of new species of Tasmanian land shells furnished by Mr. Legrand was laid on the table. The specimens have been named and described by Dr. J. Cox, of Sydney, and will form the subject of a paper at a future meeting of the Society :—

Helix medianus.
H. helice.
H. cœsus.
H. austrinus.
H. occultus.
H. ruga.
H. marchianæ.
H. Stephensi.
H. Agnewi.
Helix plexus.
H. dubitans.
H. vigens.
H. fulgetrum.
H. Gouldi.
H. Ramsgatensis.
H. Halli.
H. Nelsonensis.
H. Allporti.

The Secretary intimated that he had received from Sir Robert Officer some specimens of the so-called Red Spider, which had recently affected the hops at New Norfolk, with a request to be furnished with any information that the microscope, or the experience of any of the Fellows could throw on its exact character, habits, food, &c. These observations had been commenced, but as it had been found advisable to compare the insect from the hop with those of a similar character from the apple tree, the hothouse, and possibly other sources, no report could be laid before the present meeting, but he hoped before the next some definite information would be obtained on the subject, if the season be not too far advanced for procuring the perfect insect.

Mr. M. Allport made the following remarks on the present state of the salmon question :—As every step in the experiment for the introduction of salmon has been from time to time recorded in the transactions of the Society, it now becomes necessary to complete the series by a short account of the last step. As the Fellows are aware, one of the smolts captured in the Derwent was sent to Dr. Günther for his opinion as to its species, and that opinion is embodied in the following extract from a letter which I received by the last mail :—" Some weeks ago a small specimen of a salmonoid was handed over to me by the Secretary of the Zoological Society, with the request to determine the species, and to let you know the result of my examination. The example is 9 inches long, and from its general appearance, small size of the scales, form of the caudal fin, arrangement of teeth on the palate, number of pyloric appendages, there cannot be the least doubt that it is an example of sea trout *(Salmo trutta)*. I am informed that a lot of sea trout eggs were forwarded to Tasmania several years ago, and hatched in May, 1866; if you never on any other occasion received eggs of salmo trutta, it would follow that this example is 3½ years old, and consequently what may be called a stunted individual, as a fish of that age ought to have attained to a larger size, and exhibit a certain development of the sexual organs, of which no trace could be discovered in the individual sent." Dr. Günther is with respect to reptiles and fish, what Professor Owen is to mammals, and it would simply be presumption in me to doubt the correctness of his opinion as to the species of the particular fish sent to England, but I must demur to his assumption that such fish was 3½ years old, and therefore a stunted individual. The fact that it was immature, affords to my mind the most conclusive proof that the fish sent was not 3½ years old, and my view is borne out by all the facts relating to the salmon trout eggs received in this colony, such facts being far more within the cognizance of the Tasmanian Salmon Commissioners than Dr. Günther. In April, 1866, the only salmon trout eggs ever received by the Commissioners arrived. In May and June following they hatched. The majority of the fry were placed in the same pond with the salmon fry of that year, and the remainder were placed in a separate pond and rill, specially prepared for them, in the hope that these salmon trout might arrive at maturity, and spawn be obtained from them without the usual migration to the sea. A large proportion of the young salmon trout which were placed in the salmon pond, assumed the smolt dress, and left for sea in October, 1867; and in October, 1868, all that were then left, departed in the same manner. Of the salmon trout retained in the special pond, several put on the smolt scales in November, 1867, became uneasy at their detention, and one or two which jumped out of the pond died; of these latter, one is on the table before you. In November, 1868, the same restlessness under restraint was exhibited by the remaining fish and many died, leaving only 12 survivors. These 12 fish, however, were kept well fed, and became handsome silvery fish, weighing from half a pound to more than one pound, and in June, 1869, five pairs of them constructed spawning rids and deposited ova. In September last this ova hatched, and the two fish now exhibited are of the produce of such ova —these two fish are seven months old, and do not in the least resemble stunted unhealthy fish; nor could they be the progeny of such. They bear about them the distinct characteristics of the parr of one of the migratory salmonidæ, and when fresh from the water exhibited in great perfection the brilliant orange coloured fins from which the parr of *Salmo trutta* derives its trivial English name. Bearing in mind all the above facts, I must now revert to Dr. Günther's assumption, that the fish sent to England was hatched from the ova received here in 1866, and was consequently 3½ years old. I have shown that the last of the fish derived from those eggs, which were at liberty to do so, went to sea in November, 1868; in June, 1869, the smallest of those unnaturally detained in fresh water weighed half a pound, had unmistakeably passed the smolt stage, and had arrived at sexual maturity. Yet, we are asked to believe that the fish sent to England had found its way more than 30 miles from its birthplace, and had been 12 months in salt water without adding one inch to its length, or one ounce to its weight. If it can be shown that it is possible, nay even probable, that our original salmon trout, spawned in Tasmania in the winter of 1868, all difficulty in accounting for the capture of the specimen sent to England vanishes, without the necessity of having recourse to the forced and unnatural assumption that such specimen was an abortion. Our first salmon trout smolts went to sea in November, 1867. If any of those smolts returned (as many British authorities assert they would) in February following the fish that so returned must have spawned in the winter of 1868, that is to say in June of that year, and a portion of the fry hatched in September, 1868, would have arrived in October, 1869, at the very stage in which the specimen sent to England was when caught. As scientific truth is, to my mind, of greater importance than the discussion of mere theories, I must here point out that none of the fish retained in the special pond did spawn in the winter of 1868, but it is quite possible that their unnatural detention from salt water retarded their sexual development for a year beyond their brethren, which were free to seek their own advantage in suitable waters. In conclusion, I may state that the beautiful specimen now before you, and which was caught six weeks later than that sent to England, will be forwarded (with the other specimens referred to) to the Zoological Society, London, by the outgoing mail, and be submitted to the examination of any scientific men taking an interest in the subject. In this large specimen, I found the rudimentary sexual organs well developed, and, further, by the help of the written descriptions of Yarrell and Dr. Günther, I have come to the conclusion that it is a true *salmo salar*.

Judge Francis, of New South Wales, offered some remarks to the effect that he had had long and varied experience of fishing generally, and although rather a practical sportsman than a scientific naturalist, was perfectly well acquainted with the appearance and habits of the Salmonidæ in the lakes and streams of England, Wales, and Scotland. He had also frequently compared the young of the different varieties with each other and could speak with confidence in the matter. He had not the slightest doubt that the specimen now before them (caught Dec., 1869) was a true salmon, and a fine and well-grown fish. He would say it had been about eight weeks at sea—was assuming the grilse condition, and would in the course of the autumn have proceeded up the river to spawn. As to the fish sent home (of which an exact counterpart was said to be before the meeting) he could not in any way agree with Dr. Günther's hypothesis that it might be a stunted or abortive individual, incapable of performing the functions of reproduction. In the case of a young salmon in one of the Welsh brooks, which had been accidentally debarred from proceeding to sea, he had had the opportunity of noticing how these unnatural circumstances affected the appearance of the fish, and certainly its lanky and big-headed figure was unmistakeable. There could, therefore, be no difficulty in coming to a conclusion as to a fish being stunted or otherwise, and no one could look on the comely and shapely specimen before them and say it was imperfect in any respect. Even admitting, however, that the fish sent home was, as Dr. Günther admitted, a *Salmo trutta*, that fact alone was confirmatory of the entire success of the experiment. They knew, that of the *Salmo trutta*, about two hundred only were sent to sea, whilst of the *Salmo salar* not less than four thousand five hundred were liberated from the breeding ponds. If, therefore, several of the former had been caught in the salt water, so full of health and vigour as to show they were at home in these southern waters, *a fortiori* how much more certain was it that the true salmon had escaped all their imaginary danger, and in far greater numbers than the others had become thoroughly acclimatised.

Discussion of a conversational character ensued, in which the Rev. Dr. Bleasdale, Mr. Buckland, Mr. Giblin, Mr. Stephens, and Judge Francis took part. In reply to an observation by the latter to the effect that he wished we had a fresh supply of salmon ova at command, in order to try if in the event of the young fish being retained in the ponds, and never allowed to proceed to sea, they could arrived at maturity, and prove capable of perpetuating their species.

Mr. Allport stated that in part II, of the proceedings of the Zoological Society for 1868, there was a paper on the supposed arrest of the development of the salmon when retained in the fresh water, by James Murie, M.D., F.L.S., F.G.S., and from which paper it would appear that the experiment had been virtually tried if it could be positively ascertained that the fish experimented on were really specimens of salmon salar, but on this point authorities differed. In the account of the experiment the most curious circumstance noted was that in the summer of the second year several of the fish assumed the silvery scales of the smolt, which scales were partially lost in the autumn following, the parr markings becoming again distinctly visible. This was repeated in the summer and autumn of the third year—after the fourth year the fish came to a standstill as to growth, and at the end of the fifth year only two remained, figures of which accompany the paper referred to. These figures show them to have been large-headed long-bodied fish with the parr markings distinctly visible, and bearing little resemblance to a healthy smolt.

A vote of thanks having been accorded to the donors of presentations, the meeting terminated.

CONTRIBUTIONS TO THE PHYTOGRAPHY OF TASMANIA.

By Ferd. Von Mueller, C.M.G., M.D., F.R.S.

II.

The following pages have but slight claims on special scientific consideration. They are merely the results of a short excursion through Tasmania, at a time when the writer sought invigoration from the bracing air and rural tranquillity of the island, and preferred to spend the very few days allotted to his stay rather in the undisturbed highland solitudes than in the pleasures of sociality. He bent his way to the phytologically unexplored ranges of Mount Field, to institute a comparison of their vegetation with that of other alpine rises of Tasmania. The charm of this occupation was augmented by the circumstance that it was his first visit to a country whose vegetation he had aided to elucidate from museum-materials more than 20 years since, and with whose plants he commenced to become acquainted fully 30 years ago. Here, then, for the first time, he could glance over the many endeared highland plants, in all their gay freshness and wild natural grace! This short exploratory tour had still another additional interest. It afforded means of contrasting not only the considerations of many alpine plants of Tasmania with the complexer of highland species in the Australian Alps, but it led also to some researches by which the relation of the existing Tasmanian vegetation to distinct geological formations should be traced. In this direction lengthened inquiries need yet to be carried on—inquiries which are of general philosophical importance.

For the notes herewith offered, some material was also contributed by enlightened and generous friends, whose taste and knowledge led them to observe the forms of vegetation near their domiciles. It may encourage future inquiries to know that the whole tracts of lofty ranges from West Mount Field to Mount Humboldt and Frenchman's Cap remain, as regards vegetable life, hitherto utterly unexplored; that also from the country about Port Davey hardly any plants have ever been brought away, although the snow-clad summits of the former, and the jungles of the latter, must teem with rarities. Even the extreme north-east of Tasmania, as well as Hunter's Island and the adjacent shores, promise to render known to systematic searchers many kinds of plants, with which we are only hitherto acquainted from Gipp's Land, and this remark applies still more forcibly to portions of the Furneaux Group and to King's Island. Indeed the three genera recorded on this occasion for the first time as Tasmanian—viz., Elæocarpus, Pseudanthus, and Leeuwenhoekia—came from the islands of Bass Straits. The freshwater plants of all Tasmania need yet largely renewed investigation. Again, any tide may cast ashore additions to the 300 Algae which, through the glorious labours of Professor Harvey and his co-adjutors, rendered Tasmania famed as one of the richest and most remarkable phycolagii stations of the globe. Since Flinder's voyage in the beginning of this century, hardly any new searches after marine plants have been instituted at Kent's Group, yet Turner obtained, for his large work, from there some of his rarest treasures. Under any circumstances, we have still much to learn in reference to the range of the species over the main island and all the islets which stand under Tasmanian dominion. To Wilson's Promontory, Queenscliff, or Cape Otway, on the extremes of the Victorian coast, numerous plants extend, of the existence of which on the islands of Bass's Straits we are as yet not aware, however likely such may be. We may be thus reminded of the probability that such plants as Cakile maritima, Erodium cygnorum, Drosera, Whitakiri, Viminaria denudata, Acacia oxycedrus, Myriophyllum, Muelleri, Leptospermum myrsinoides, Eclipta platyglossa, Lobelia platycalyx, Banksia integrifolia, Hakea nodosa, Triglochin muconata, Lemna oligorrhiza, Aspidium decompositum, Blechnum cartilagineum, &c., would likely not in in vain be searched for on the Straits' islands, not to mention many other species. Enough has been explained to demonstrate the desirability of carrying phytological investigations into many new directions within Tasmanian territory; and that this end may early be attained is all the more to be desired, while yet the volumes of the universal work on Australian plants are under elaboration. The writer of this brief record, should life and health be spared him, will always experience delight in the elucidation of plants from any of the localities indicated, or of places otherwise remarkable; and this would afford him also the privilege of continuing this series of essays for the meetings and literary notices of the Tasmanian Royal Society.

Melbourne Botanical Garden,
New Year's Eve, 1869.

Caltha introloba, F. M. in transact, Phil. Soc. Vict. i. 98. On alpine brooks of Mount Field East, at an elevation of 4000′.

Lepidium foliosum, desv. Journ. Bot. iii. 164. King's Island.

***Fumaria officinalis*, L. sp. 984. King's Island, immigrated but now naturalized.

***Papaver aculeatum*, Thunb. Fl. cap. 431. King's Island.

Drosera Arcturi, Hook. Journ. of Bot. i. 247. In alpine morasses of Mt. Field East, at 3–4000′ elevation.

***Elæocarpus cyaneus*, Ait. Epit. hort. Kew. [illegible] 367. In various parts of King's Island; M'Gowan.

Lasiopetalum dasyphyllum, Sieb. according to Hook. Journ. ii. 404. Schouten Island; Dr. Story.

Acaena montana, T. Hook. in Lond. Journ. of Bot. vi. 275. On alpine springs at Mt. Field East, 3–4000′.

Rubus Gunnii, Hook. icon. plant. t. 251. Descends on Mt. Wellington and Mt. Field East to 3000′.

Bauera rubifolia, Salisb. in Kon. and Sims's Annal. of Bot. i. 514 t. 10. In a depressed small-leaved state ascending the summits of Mt. Field East and Mt. Wellington, therefore undoubtedly hardy in Middle Europe.

Donatia Novæ Zelandiæ, J. Hook. Flor. Nov. Zel. i. 81. t. 21. On moist alpine meadows bordering Lake Fenton at about 3000′ elevation. The remarkably rigid white flowers scattered like pearls over the shining green cushions of the foliage impart to this plant a singular beauty.

Platylobium formosum, Sm. in Transact. Linn. Soc. ii. 351. At Swanport; G. Story.

Pultenæa pedunculata, Hook. Bot. Mag. t. 2859. Kelvedon; G. Story.

Melaleuca squamea, La Bill. Nov. Holl. plant. spec. ii. [illegible]. t. 68. On the summit of Mt. Field East, bearing flowers and perfect fruit, although only a few inches high.

Eucalyptus urnigera, J. Hook. in Lond. Journ. of Bot. vi. 477. In the alpine regions of Mt. Field East, together with E. coccifera and E. Gunnii.

***Pseudanthus ovalifolius*, F. M. in Transact. Phil. Inst. Vict. ii. 66. Gathered in Flinder's Island nearly a quarter of a century ago, by Dr. Jos. Milligan.

Ricinocarpus pinifolius, Desf. in mem. du mus. iii. t. xxii. Schouten Island; Dr. G. Story.

Stackhousia spatulata, Sieb. in Spreng. syst. cur. post. 124. King's Island.

Spyridium serpillaceum, F. M. Fragm. Phyt. Austr. ii. [illegible]. At Swansea; Story.

Spyridium ulicinum, Benth. flor. Austr. i. 434. The variety with bifid leaves on the Derwent at Fenton's Forest. Fruits separated by the bracts and often solitary. *Carpels* 1 line long, ovate, without a spacious aperture.

Actinotus bellidioides, Benth. Flor. Austr. iii. 369. On moist alpine meadows at Lake Fenton, 3000.′

Huanara cordifolia, J. Hook. and Benth. gen. plant. i. 877; Diplaspis cordifolia, J. Hook. Fl. Tasm. i. 157. On springs in the highest regions of Mt. Field East.

Galium albescens, J. Hook. in Lond. journ. of Bot xvii. 462. Swanport; Dr. Story.

Abrotanella forsteroides, J. Hook. Handb. New Zeal. Flor. 139. On Mount Field at an elevation, from 3500′ to 5000′, accompanied there by Pterygapappus Lawrencii. The dense cushion-like patches of these two plants impress quite a peculiar feature on the alpine vegetation of Tasmania, when contrasted with that of the Australian Alps, although this cushion-like vegetation of Composites is still more extensively developed among the alpine plants of New Zealand. The patches of Ptorygapappus are less vividly green and shining than those of Abrotanella, and more velvety in aspect. The former I did not observe on Mt. Wellington. Both deserve to be transferred to Musea, and it might be even tried to bring large aged masses to the Sphagnum-moors of Britain. Out of these patches sprout species of Restio, Danthonia, Sprengelia, Styphelia, and other plants in a diminutive state. Pterygopappus forms either cushions by itself or is nesting in those of Abrotanella. The peduncles of the former are not rarely as much as one inch long.

Cotula filicula, J. Hook. in Benth. Fl. Austr. iii. 551. Mt. Field East, 3-4000′.

Cotula alpina, J. Hook. Fl. Tasm. i. 192, t. 51 A. Mt. Field East, 4-5000′.

Aster ledifolius, A. Cunn. in Cand. prodr. v. 269. Mt. Field East.

Aster pinifolius, F. M. fragm. v. 71. Mt. Field East.

Aster persoonoides, A. Cunn. in Cand. prodr. v. 268. Mt. Field East.

Aster obcordatus, F. M. fragm. v. 69. In the alpine and sub-alpine regions of Mt. Field East.

Craspedia Richea, Cass. dict. soreni. nat. xi. 353, var. leucocephala. Mt. Field East.

Helichrysum scorpioides, Lab. Nov. Holl. plant. spec. ii. 45, t. 191; var. pygmaea. Stems when flowering only 2-3 inches high. Alpine summit of Mount Wellington; Abbott and Mueller.

Helichrysum pumilum, J. Hook. Flor. Tasm. i. 213, t. 60. Mt. Sorell; Dr. Milligan.

Helichrysum Backhousii, F. M. in Benth. Flor. Aust. iii. 632. Mt. Sorell and Black Bluff Mountain; Dr. Milligan. Mt. Field East.

Helichrysum Gunnii, F. M. in Benth. Flor. Austr. iii. 630. Flinder's Island; Milligan.

Helichrysum antennarium, F.M. in Benth. Flor. Austr. iii., 632. At an elevation of 2–3000′ on Mt. Field East.

Helichrysum baccharoides, in Benth. Flor. Austr. iii. 633, Mt. Field East in alpine regions.

Helichrysum rosmarinifolium, Less. in Stend. nom. ed. i., 1821; var. erubescens on Mt. Field East. This shrub is of balsamic fragrance.

Helichrysum lycopodioides, Benth. Flor. Austr. iii., 634. On this rare plant Dr. Story offers the following observations:—"I have discovered this on another locality, the summit of the rocky hills above Kelvedon, not growing by itself, as I always found it previously, but amongst other plants, much shaded by them; and hence instead of being a straight-stiff plant from 4 to 5 feet, it has grown slender, lax, and crooked, with long naked stems, but is easily recognised by its peculiar flowers. When in perfection it chose a bare spot with but little soil, which forms a shallow basin on the rock holding some water."

Gnaphalium indutum, J. Hook, in Lond. jour. of Bot, t. 121. King's Island.

Gnaphalium Japonicum, Thunb. Fl. Japon. 311, var. monocephala. A dwarf variety less than one inch high, forming dense tufts on the flat, cold summits of Mt. Field East; its leaves, are very small, lanceolate or oval, densely grey—downy on both sides. The precise position of G. Travirsi to this variety merits further enquiry, especially as on the Snowy River in the Australian Alps scapelus forms of G. Travirsi occur, scarcely distinguishable from this one-headed variety of G. Japonicum.

Antennaria nubigena, F. M. in transact, Phil. Soc. Vict. i. 45, var. Meredithæ. On the highest alpine meadows of Mt. Field East in springy localities. This new form, to which possibly specific value could be attributed, differs from the ordinary plant in a less dense finally somewhat flavescent indument which in age almost disappears; moreover its stems are often elongated into somewhat distantly foliate or bracteate peduncles, which attain a length of 1½ inches; the radiating scales are longer; the female flowers are far less slender, also less numerous and more persistent; the bristles of the pappus are more rigid and in their length more barbellate, while the achenes are almost silky. These characteristics, whether specific or indicating a singular variety, are sufficiently marked to entitle this plant to a special record, and I avail myself of this opportunity of attaching to this everlasting the name of a lady, who by her artistic skill, her fondness for flowers, and her literary accomplishments, has much contributed to raise a taste for the local study of the lovely Tasmanian vegetation.

To this species approach in many respects Helichrysium Youngii as well as Raoulia subsericea from the South Alps of New Zealand.

Senecio centropappus, F. M. catal. Melb. Bot. Gard. 1858, pag. 26. Descends at least to 2000 feet on Mt. Wellington, which as yet remains the only known locality of this singular plant. It attains a height of at least 20 feet.

Senecio pectinatus, Cand. prodr. vi. 372 ; var. ochroleuca. This variety is frequent on the alpine plateau of Mt. Wellington, but I did not observe it on Mt. Field East. It produces short-toothed leaves, single flower heads and ligules almost white. Although S. pectinatus is widely spread over the Australian Alps, I never noticed it with cream-colored rays. S. leptocarpus, a variety of this plant, occurs on Mt. Field East.

**Lobelia pratioides*, Benth. Flor. Austr. iv. 131. South Esk.

Goodenia humilis, Br. pr. 575. A one-flowered variety, only about one inch high, was discovered many years ago by Dr. Milligan at Macquarie Harbour.

Scaevola Hookeri, F. M. first gen. rep. xv. On springs and in crevices of rocks. On the alpine parts of Mt. Field East.

**Leeuwenhoekia dubia*, Sond. in Lehm. pl. Preiss. i. 392. A solitary specimen of this minute plant adhered to a specimen of Helichrysum bractatum, var. albiflora, from Strzelecki's Peak, Flinder's Island, in Dr. Milligan's collections. The plant abounds in some parts of Australia Felix.

**Styphelia lanceolata*, Sm. Bot. New Holl. xlix. Port Dalrymple; R. Brown according to Bentham.

Styphelia dealbata, Br. pr. in nota 536. Depressed into densely intricate very dwarf masses, like those of Decaspora pumila on the higher parts of Mt. Field East, sometimes growing out of cushions of Pterygopappus.

Styphelia Hookeri, F. M., fragm. vi. 44. Mt. Field East, 3–4000′.

Styphelia pinifolia, Br. pr. in nota 536. Schouten Island; G. Story.

Styphelia straminea, Br. pr. in nota 536. In the higher regions of Mt. Wellington and Mt. Field East. Flowers as indicated by the specific name, greenish yellow, not white.

**Styphelia scoparia*, Sm. Bot. New Holl. 48. Bay of Fires; Walt. Bissell.

**Styphelia elliptica*, Sm. Bot. New Holl. 49. Swanport; Story.

Trochocarpa thymifolia, Spreng. syst. veg. i. 650. Mt. Field East.

**Brachyloma depressum*, Benth. Flor. Austr. iv. 173. Bicheno ; G. Story.

Epacris acuminata, Benth. Flor. Austr. iv. 240. New Norfolk; Mt. Wellington; N. W. Bay; Gunn and J. Hooker.

Richea sprengeloides, F. M. Fragm. vi. 68. Mt. Field East, 3–4000′. Seldom above 3′ high. Corolla yellowish-white.

Richea acerosa, F. M. Fragm. vi. 69. Mt. Field East, 3–4000′, on Alpine flats. A shrub 1½–3′ high. Corolla nearly white.

Richea scoparia, J. Hook. in Lond. Journ. of Bot. vi. 273. Mt. Field East.

Richea Gunnii, J. Hook. in Lond. Journ. vi. 273. Mt. Field East.

Richea dracophylla, Br. prodr. 555. Lake Fenton.

Richea pandanifolia, J. Hook. Fl. antarct. i., 50. Under the shelter of the highest alpine ridges of Mt. Field East, at 4,800′ and descending to 4000′ on the slopes towards Lake Fenton. This magnificent plant is said to occur also on the back parts of Mt. Wellington, but possibly Dracophyllum Milligani, which attains on Mt. La Perouse a height of 40′, may have been confused with this Richea, both being so similar in habit. I noticed on Mt. Field stems clothed to the length of 12 feet, with the very aged leaves and panicles, which thus are shown to be sometimes persistent for many years. The auxiliary inflorescence is remarkable. The flowers occur as often brilliantly red as white, and in all intermediate shades. Mess. Rayner contend that they had seen this Richea attaining a height of about 70 feet in the rich alpine valleys of the Gordon River.

Pernettya Tasmanica, J. Hook. in Lond. Journ. of Bot. vi., 268. At Mount Field East, from 3000′ to 4000′ elevation.

Solanum vescum, F. M. in Transact. Vict. Inst. 1855, 69. King's Island; also towards the Russell's Falls. Probably hybrids between this species and S. avidilare may occur. It produces occasionally white flowers.

Ourisia integrifolia, Br. pr., 439. On the highest alpine brooks of Mt. Field East sparingly, but on the summit of Mt. Wellington frequently occurring. The habitual aspect of this neat plant is almost that of a Gentian. It attains a height of fully six inches, with occasionally three pairs or whorls of cauline leaves. Corolla pure white.

Gratiola nana, Benth. in Cand. prodr. x., 404. Mt. Field East.

**Veronica notabilis*, F. M. First Gen. Report, 1853, 17. St. Patrick's River; R. Gunn.

**Veronica plebeja*, Br. pr. 435. At Swanport; G. Story.

Veronica nivea, Lindl. Bot. Reg. 1842, misc. 42. Mt. Field East.

Mitrasacme montana, J. Hook. Fl. Tasm. i., 274 t. 88 c. On

Lake Fenton. The inequality of the sepals, faithfully represented by Fitch's drawing, is often particularly conspicuous in the fruit-bearing calyx. The ripe seeds of this and the following species need still comparison.

Mitrasacme Archeri, J. Hook. Fl. Tasm. ii. 368. In the most elevated valleys of Mt. Field East and also on Lake Fenton. The leaves are singularly shining and rigid, along the edge remarkably transparent, and not so distinctly narrowed into the petiole as those of the M. montana.

* *Lithospermum arvense*, L. sp. pl. 190. Naturalised in King's Island.

* *Myoporum parvifolium*, Br. pr. 516. In marshes at Long Point, Flinder's Island; Dr. Milligan. To this plant belongs probably M. Tasmanicum j. J. Hook. Fl. Tasm. i. 287.

Myoporum insulare, Br. pr. 516. To this the ordinary forms of M. Tasmanicum are referable.

Chenopodium glaucum, L. sp. pl. 320. To this belongs probably C. furfuraceum, Mog. in Cand. prodr. xiii. ii., 64, recorded as a Tasmanian plant from D'Entrecasteaux's Straits.

Australina pusilla, Gaudich. voy. Uranie 305. Macquarie Harbour; Dr. Milligan.

Leptomeria glomerata, F. M. in Jos. Hook. Flor. Tasm. ii. 370. Macquarie Harbour; Dr. Milligan.

**Pimelia axiflora*, F. M. in Linnaea xxvi. 345. King's Island.

* *Pimelea stricta*, Meissn. in Linnaea, xxvi. 348. Swanport; Dr. Story.

Pimelea serpillifolia, Br. pr. 360; Flinder's Island; Dr. Milligan. King's Island.

Pimelea sericea, Br. pr. 361. Frequent on Mt. Wellington, but not noticed on Mt. Field East.

Orites acicularis, Br. suppl. 32. Abundant on Mt. Field East from 3-4000′. The foliage of a remarkable yellowish green. Sepals white, with reddish tinge outside.

Orites diversifolia, Br. pr. 388; Mt. Field East, 2-4000′. The leaves some times toothed from the base.

Hakea lissosperma, Br. pr. 382. In the fern tree regions of Mt. Field East.

Bellendena montana, Br. pr. 374. In the alpine regions of Mt. Field East, descending to 2500′. Flowers almost white, tinged at the upper extremities with red. The pedicels sometimes dark-red. Some of the leaves may occur perfectly entire.

Fagus Cunninghamii, Hook. journ. 1840, p. 152, t. 7; var. alpina. Depressed by exposure and cold to a small shrub, as well on Mt. Wellington as on Mt. Field East. Leaves only 3-4 lines long.

Athrotaxis cupressoides, Don. in Transact. Linn. Sot. xviii. 172 t. 13. On Lake Fenton at 5000′ elevation.

Athrotaxis laxifolia; Hook, icon-plant, t. 573. Among boulders on the descent from Mt. Field East to Lake Fenton. Nearer the following than the preceding species.

Athrotaxis selaginoides; Don. L. P. 172, t. 14. At Mt. Field East, from 3000′ to 4000′.

Podocarpus alpina, R. Br. in Mirb. mem. du mus. xiii., 75. Creeping over boulders on the summit of Mt. Field East.

Microcachrys tetragona, J. Hook, in Lond. Journ. Highest alpine valleys of Mt. Field East. The whole fruit becomes in maturity beautifully crimson.

Pherosphaera Hookeriana (W. Archer in Hook. Lond. Journ. of Botany ii. 52 in part.; J. Hook. Fl. Tasm. i. 355, t. I C). On the highest springs of Mt. Field East. An erect shrub, 2–4′ high. Mr. W. Archer, F.L.S., of Cheshunt, who many years ago defined the genus Pherosphaera and more recently aided Dr. Hooker in the elucidation of the Alpine Coniferæ of Tasmania, has shown me the kindness, while on a visit to Melbourne, to examine this plant with me. We established from remnants of the male amenta the identity of one of the dwarf, but erect, Coniferæ of Mt. Field with his Pherosphaera, fruit not being found, although I searched long for it. It is however not improbable, that Diselma exists also there, and it seems even contained in my collection, as it is not easy to distinguish these bushes, except when in flower or fruit. That Pherosphaera much differs in habit from Microcachrys, is now for the first time rendered known. The absence of the genera Microcachrys, Diselma, Pherosphaera, and Athrotaxis in the Australian and New Zealand Alps, and indeed, in any other part of the globe, remains a remarkable phytographic fact.

* *Potamogeton marinus* L. Sp. 184. In marshes between Bridgewater and New Norfolk; F. Abbott.

Hewardia Tasmanica, Hook. ic. pl., t. 858. Lake Fenton.

Uncinia compacta, Br. pr. 241. On alpine brooks at Mt. Field East.

Oreobolus Pumilio, R. Br. pr. 236. Alpine regions of Mt. Field East.

Herpolirion Novae Zelandiæ, J. Hook, Fl. N. Zeal. i. 258; H. Tasmaniæ, J. Hook, Fl. Tasm. ii. 54, tab. cxxxii. B. Found very many years ago by Mr. Milligan on the summits of the Hampshire Hills.

Lycopodium Selago, L. sp., pl., 1565. Mt. Field East.

Isoetes Gunnii, Al Braun in den Monat's berichten der Koen, Akad., der Wissensch. zu Berlin, 13 Aug., 1868. On the shallow marginal bottom of Lake Fenton I observed tufts fully half a foot in diameter. The leaves are so rigid, that my companions bestowed jocularly the name "Water Porcupine" on this plant.

The Tasmanian species of Isoetes became very recently the subject of Prof. Braun's masterly researches. From the important memoir above quoted I have translated the cardinal characters of the diagnoses, which I here the more readily subjoin, as the essay will not be easily accessible to Australian observers. The repetition of some of the characteristic notes was deemed necessary to contrast the four Tasmanian species with three or four from continental Australia, and with several other, to us, exotic species, those of Tasmania being all endemic. It is, however, possible that some of them may yet be discovered in the Australian Alps, or in the rivers of the lowlands of Victoria.

Isoetes Gunii, Al. Br. L. C., and Monats Berrichton, 22 July, 1869. Lacustrial; rhizome three-lobed; leaves short, very stout, rigid; cuticle olive-brown, thick; sheath brown; stomata absent; vellum, none or rudimentary; sporangium small, upwards flat, acute at the margin, with copious sclerenchymatic cellules, macrospores very large, beset with numerous minute tubercules, microspores indistinctly tuberculate. In alpine lakes.

**Isoetes elatior*, F. M. in Linnea 1852, 722; Al. Br. L. P. 536.

Fluvial; rhizome 3-lobed; leaves very long, flaccid, green; sheath pale; stomata absent; velum none or rudimentary; sporangium pitch-coloured, upwards flat, at the margins acute with copious sclerenchymatic cellules; macrospores moderately large, pale, beset with numerous minute tubercules; microspores distinctly tuberculate. South Esk.

* *Isoetes humiliar*, F. M., L. P. 722; I. Hookeri, Al. Br. L. P. 538.

Fluvial, rhizome, bilobed; leaves hard; cuticle thick, turning brown; sheat brown, short; stomata absent; vellum complete; closed, brown; sporangium without sclerenchymatic cellules; macrospores rather large, pale, beset with numerous minute tubercules; microspores intensely brown, short tuberculate, South Esk.

Isoetes Stuartii. Al Braun, L. P., 539.

Fluvial; rhizome two-lobed; leaves rather slender and soft, green; cuticle thin; sheath pale; stomata absent; vellum complete, closed, pale; sporangium mottled with brown and pale thickened sclerenchmatic cellules; macrospores rather large, pale, beset with numerous minute tubercules. South Esk.

An excellent series of specimens of Isoetes, very obligingly secured by the Honourable W. Archer, from the waters of the Western Mountains, are since some time in the hands of Monsieur Durien de Maisonneuve, for elucidation in his illustrated monography of the genus.

SOME ADDITITIONAL OBSERVATIONS ON MORE RECENT CHANGES WHICH HAVE TAKEN PLACE IN THE STAR η ARGUS AND ITS SURROUNDING NEBULA.

BY F. ABBOTT, F.R.A.S., F.R.M.S., READ 12TH APRIL, 1870.

I would remind the members present, that many of the notes in this short paper are intended to answer questions that have arisen in various discussions which have taken place on the preceding one on the same subject read in 1868.

These notes have been, for the most part, suggested by some critical remarks, made on the subject by Sir John Herschel, to which I shall presently refer.

In continuation of the observations detailed in the commucations referred to, I now bring under the notice of the Society a third paper, with accompanying drawings, relative to this singular object which has of late caused long and animated discussion in the astronomical world.

When I first brought the subject under the notice of the Society (see Papers and Proceedings for June, 1863), I was fully aware that the varied changes there recorded as having taken place in the object, and particularly the fluctation of the Nebula, would cause great excitement; but did not expect it would meet with the severe critical test to which it has been subjected by Sir John Herschel, who, commenting on the drawing at a meeting of the R.A.S., remarks that "The question is not one of minute variations of subordinate features which may, or may not be attributable to differences of optical power in the instruments used by different observers, as in the case of the Orion Nebula—but of a total change of form and character—a complete subversion of all the greatest and most striking features, accompanied with an amount of relative movement between the star and the Nebula, and of the brighter portions of the latter *inter se*, which remind us more of the capricious changes of form and place in a cloud drifted by the wind. The great increase of light that has taken place in the brightness of the Nebula is very remarkable; it could not be seen at all by the naked eye, when I was at the Cape, but the changes which have taken place in the figure of the Nebula are still more startling. Mr. Abbott supplies two pictures, one representing the appearance of the Nebula as seen in 1863, the other drawn in February 1868. Neither of these pictures resembles my drawing of 1834-8 in the slightest degree, nor do the two pictures in any way resemble each other, and Mr. Abbott remarks that a series of drawings taken at comparatively short intervals of time would afford even stronger evidence of the mutability; this is very strange, no phenomenon in nebulous or sidereal astronomy as yet ever turned up like this, and it must be settled."

Sir J. Herschel clearly supposes by these remarks, that my drawings are meant to indicate the true arrangement of the stars. He has been at great pains to try all possible means of reconciling his own splendid drawing of the Nebula with mine, so far as the distribution of the stars is concerned, but without being able to find a situation of the tracing paper, in which any tolerable coincidence of the stars in the two drawings could be noticed.

Lieutenant Herschel, Sir John's son, was sent out to India at the head of a party of scientific men to observe the great eclipse of August 18th, and was fully commissioned to settle in some way the nature of the capricious changes recorded of this object; how he succeeded can be seen by a comparison of his drawings with my own, and that of the Cape Monograph, now lying on the table. On the receipt of these drawings Admiral Manners, President of the Royal Astronomical Society, thought that Lieut. Herschel had not sufficient instrumental means at his disposal to settle the question.

The first object to be examined with the large Melbourne reflector was the Nebula in Argus, in reference to which Gen. Sabine, in his recent address to the Royal Society, regrets the temporary failure of that telescope from some cause or other not clearly known, but reminds the Society that it has been able to show some of the changes recorded in the Nebula of Argus.

These preliminary remarks will tend to show the present meeting a part of the interest excited by my last remittance to the Royal Astronomical Society on the subject, and I think the present paper and drawing will tend to set all doubts as to the fluctuations that have already taken place at rest.

The severe critical remarks of Sir John Herschel on the drawing and notes of 1868 were made with a view of disproving that which I never intended to prove, viz., a correct measurement of the distance applied to all the stars in the field of the telescope; this in all probability arose from my not having expressed myself with sufficient clearness in my remarks on the drawing which accompanied the observations. In this way the road to truth often runs through the midst of error, but that does not in any way alter the fact that changes have been, and still are taking place in the object—such changes being principally confined to a space near to η and the so-called lemniscate*

As some objections have been raised on the ground that larger optical means than those employed by me are required for recording truthfully the changes which occur in this object, it may be well, perhaps, to state that the 5ft. equatorial previously mentioned, although the best for the purpose, is not the only instrument at my command; other telescopes have been used in the open air, from a $3\frac{1}{2}$ inch Cook and Son's, to a 7ft. Dollond—with, for the whole, a complete battery of Micrometers, and eye-pieces giving magnifying powers of from 25 to 450. This statement may go towards proving that with due care such observations can be correctly made without very large instruments.

In Mr. Proctor's article on the Nebula in Argo, (*Frazer's Magazine* for December, 1868,) it is stated not to be quite clear that the stars which appear in my drawing of 1868 have been really copied from the view given by the telescope, &c. In reply to this I beg to state that all the drawings, the present, as well as the former ones, were carefully copied from the object,as described in the *Astronomical Register* for January, 1869. There is little doubt but that Mr. Proctor's views on this subject would be much enlarged if he had the opportunity of seeing the star and its Nebula as they appear in the telescope, when above the Pole, at Hobart Town.

Having now seen the object with the large Melbourne reflector, and compared the effect with that produced by my own instruments during the last two years, I feel greater assurance in communicating the result of observations on the changes which have taken place since 1868.

On comparing the present with the former drawing, it will clearly appear that alterations have taken place, both in the magnitude of the star η, and in the dispersion of the Nebula, and from what follows it will be seen that the remarks made by Professor Loomis and others on the period of this star are premature. At the time of my visit to Melbourne (21st June last), Mr. Ellery considered the star η to be of the 7th magnitude, and Mr. Le Suer thought it to be $6\frac{1}{2}$. On returning to Hobart Town, and resuming the observations on this interesting object, I found by comparison with other stars, given in the drawing and recorded in the Cape Catalogue as of the

* I scarcely think this term a good one, *Lemniscate*, or *Lemniscus*—a curve formed as the figure 8, or a bow tied of a riband (Barlow and B. H. Smart). Such a curve is closed in the centre, which is not the case in the Cape drawing, the space being there shown as a long enclosure, slightly compressed in the centre. It was in this compressed part of the dark space that the star η appeared when out of the dense Nebula in 1863,

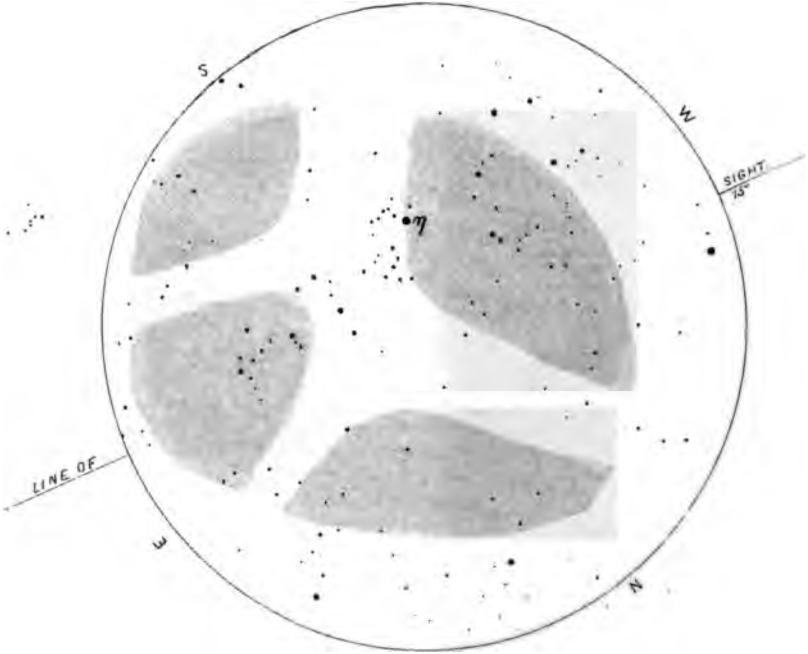
7th magnitude, that η Argus cannot now be more than a 7th magnitude star. In the catalogue there are two stars of the 6th and nine of the 7th magnitude, the remainder being all of low magnitude. In the drawing the two 6th magnitude stars are out of the field, and the nine of the 7th magnitude in the field, are by careful comparison exactly the same magnitude as η, which is left among them not marked. The magnitudes of these stars are given by Sir J. Herschel, and may be considered correct.

Measures of these stars have recently been recorded as having been made by small transit means; but from my own experience in such observations, I believe it all but impossible to measure correctly such a cluster of small zenith stars by these means. Two years ago I dismounted a 24 inch transit by Varley in order to re-place it with a 30 inch by Dallmayer, made with a deep diagonal eye-piece for the purpose of reaching small zenith stars up to the 7th mag., as agreed upon for correcting any error in longitude between Hobart Town and Melbourne. Mr. Ellery selected 49 such stars, which were to be used at both places, reversing the instruments for each observation so as to eliminate any errors. With these means, and for this purpose, I find it difficult, and only under very favourable circumstances possible, to reach zenith stars of the 7th mag. My reason for not attempting measures with the equatorial is in consequence of a long experienced difficulty arising from the want of clock movement, which I consider indispensable for the accurate measurement of distances. I have therefore preferred an eye and hand drawing when the object has been in a convenient position—approximately 75° from the meridian towards the East, and 35° from the zenith.

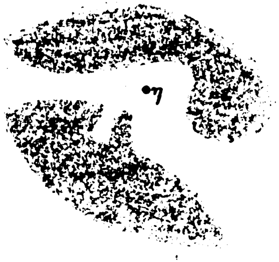
A very singular circumstance in connection with the extraordinary object under consideration is, that although it has within the last few years undergone such rapid changes, causing great excitement amongst astronomers in Europe, and laying a foundation for new theories—yet, apart from the Melbourne Observatory, scarcely any one in the Australian colonies appears to know it, notwithstanding that on every fine night through the year it is to be seen above the horizon at Hobart Town, and particularly well situated for examination, when near the meridian. The only person who occasionally studied this object with myself was a member of this Society—the late Joseph Facy—who on suitable occasions would devote a few hours to an inspection through the telescope of some of the principal objects in the great Creator's workshop. He would, in his pious zeal, apart from theological theories, frequently comment upon the mode of manipulating, mechanical, geometrical, and

VARIABILITY OF THE SURROUNDING NEBULÆ
WITH THE MAGNITUDE AND POSITION OF THE ACCOMPANYING STARS 1868

1834 – 7.

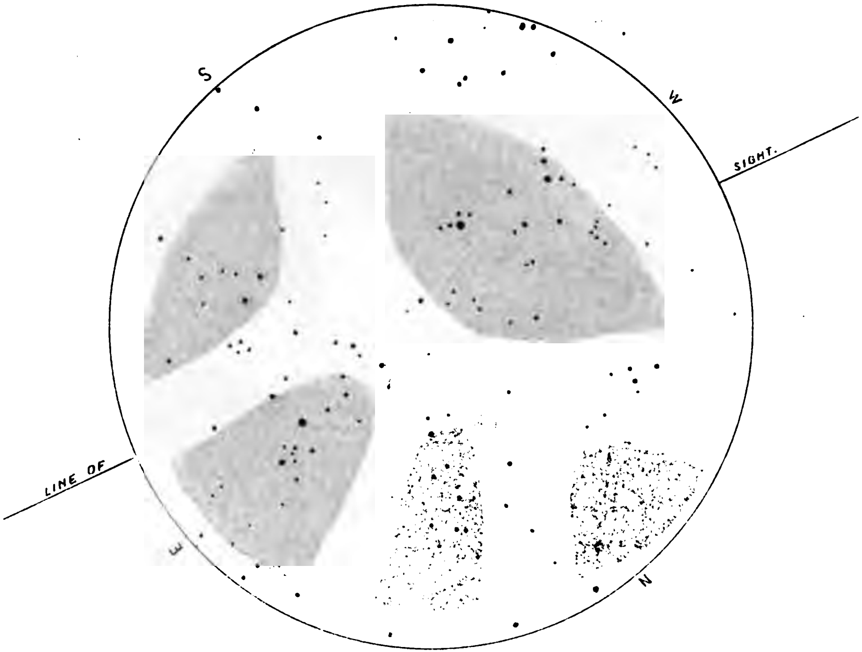


1863



1° 07′. 47.″
FROM THE YEAR 1834 TO FEBY 13TH 1868.
TAKEN AT INTERVALS

VARIABILITY OF THE SURROUNDING NEBULÆ
WITH THE MAGNITUDE AND POSITION OF THE ACCOMPANYING STARS,
UP TO THE PRESENT TIME 1870.



1° 07′. 47″.
TAKEN. JANUARY 28TH. 1870.

physical. He* on more than one occasion hazarded an opinion that the Nebula was breaking up, and the star η might disappear altogether. That such may be the case is not improbable—there are different records of variability in Nebulæ, but not to so great an extent as that in Argus; and there are catalogued numbers of variable stars of both long and short periods, with some that after a time have disappeared altogether. In 1604 a star appeared in the Eastern foot of Ophiuchus, it disappeared again in 1605, and is said not to have been seen since. Such stars are also mentioned by Montanari, Maraldi, and Sir William Herschel.

There is nothing yet known to be permanently fixed in the universe; probably the most qualified standard unit of invariability is that of *Sidereal Time*, which Laplace has ascertained from careful comparisons of modern with ancient observations.

For the record of the fluctuating magnitudes of η Argus, and its surrounding nebula, from 1677 to 1863, vide Monthly Notices, Royal Society, Tasmania, for June, 1863; since which date other changes have taken place in the nebula, and the star is decreased to the 7th magnitude.

Private Observatory,
April, 1870.

moon and the object were approaching the meridian, the light around η Argus was distinctly seen when all other Nebulæ were shut out. This increase of light may arise from one of two causes, either the Nebula has become concreted into isolated stars, or by its dispersion it has laid bare distinct stars that give out more light. The same physical forces that have worked out our own solar system are still at work in the stellar universe. Creation is still going on, and why not?

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* Mr. Facy, in addition to his qualifications as a zealous observer, possessed great power of vision, being able to detect the planet Venus in bright sunshine, with the naked eye, at all times when above the horizon, and not too near the sun.

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There is nothing yet known to be permanently fixed in the universe; probably the most qualified standard unit of invariability is that of *Sidereal Time*, which Laplace has ascertained from careful comparisons of modern with ancient observations, not to alter more than 1-100th of a second in upwards of 2000 years.

The alterations which have taken place in the Nebula since 1868 will at once be seen on an inspection of the drawings before the meeting, and by comparing them with each other. In the Cape Monograph the dark space is an inclosure, in 1863 it had two openings, in 1868 there were four, and now, in 1870, there are five, which expose a number of isolated and distinct stars, rendering it difficult, but from position to know which is the star η. There is attendant on these changes an increase of light which is notable up to the present time. During the last three full moons, December, January, and February, when both the moon and the object were approaching the meridian, the light around η Argus was distinctly seen when all other Nebulæ were shut out. This increase of light may arise from one of two causes, either the Nebula has become concreted into isolated stars, or by its dispersion it has laid bare distinct stars that give out more light. The same physical forces that have worked out our own solar system are still at work in the stellar universe. Creation is still going on, and why not?

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ROYAL SOCIETY.

JUNE, 1870.

The monthly evening meeting of the Society was held on Tuesday, 14th June, James Barnard, Esq., in the chair.

The following gentlemen, who had previously been put in nomination by the Council, were, after a ballot, declared duly elected as Fellows of the Society :—F. Aubin, Esq., Spring Bay ; C. J. Willes, Esq., Oatlands ; R. McI. Isaacs, Esq., Hobart Town ; R. C. Read, Esq., Redlands, New Norfolk.

The Secretary, Dr. Agnew, submitted the following returns for the month of May ; viz. :—

1. Visitors to Museum, 514.
2. Ditto to Gardens, 1969.
3. Plants received at Gardens.
4. Leafing, flowering, and fruiting of a few standard plants in Society's Gardens.
5. Books and Periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq., Table and Summary for May.
2. Port Arthur, from J. Boyd, Esq., ditto for April and May.
3. Swansea, from Dr. Story, ditto for February, March, and April.
4. Queensland, from the Government Observer, tables for August, September, and October, 1869 ; January, February, March, 1870 ; and table shewing rain-fall at various stations during February.
5. New Zealand, from the Government, tables for February.
6. Melbourne, from R. L. J. Ellery, Esq., table for April.

Accompanying the returns from Swansea were some remarks by Dr. Story, from which the following extract was read :—

"We have now (19th April) had nearly six inches of rain since the beginning of the month, more than has fallen in so short a time for many years ; it will no doubt act beneficially upon all vegetation. I have always observed that after a drought the rain first began in New South Wales, and when we heard of it falling there we shortly had it on the East Coast ; but this time it has been longer in reaching us than I ever before knew. Now we have had as much rain as will moisten the deepest roots."

The presentations to the Museum and Library were as follows :—

1. From G. Dinham, Esq.—A copy of "The whole workes of W. Tyndall, John Frith, and Dr. Barnes, three worthy martyrs and principal teachers of this Churche of England, collected and compiled in one tome together, being before scattered, and now in print here exhibited to the Church. To the prayse of God, and profit of all good Christian Readers. At London. Printed by John Daye, and are to be sold at his shop under Aldersgate, An. 1573."
2. From H. Cook, Esq.—"A brief and accurate treatise concerning the taking of the fume of tobacco." By Tobias Venner, Doctor of Physic, 1621.
3. From T. Giblin, Esq.—A list of subscribers (with signatures), to a testimonial for presentation to Mr. Taylor, of Macquarie River, for his spirited and manly conduct in resisting an attack upon his house by escaped convicts from Macquarie Harbour. Dated 20th July, 1824. [Of the forty-six persons whose names appear in this interesting document, only four are now living.]
4. From Mr. Cearns.—Large specimens of Oysters from North-West Bay.

5. From Mr. R. A. Jeffrey, Campbell-street.—Two large Mussels, from near New Wharf.
6. From Mr. R. Giblin.—A fish said to have been taken in Mr. Walker's mill-race.
7. From J. Butler, Esq., Dunedin, per J. W. Graves, Esq.—A thigh bone of the Moa (*Dinornis sp.*)
8. From Rev. H. D. Atkinson.—Specimen of Ibacus, from Three Hut Point.
9. From the Hon. J. Maclanachan, Esq.—A Carolina Drake, and a Peacock.
10. From Captain Serckoff, H.I.M.'s corvette "Boyarin."—A collection of Russian coins, viz:—Gold—5 roubles (half imperial), Russian. Silver—20 kopeks, Russian; 15 ditto; 10 ditto; 5 ditto; 25 penny, Finnish. Copper—5 kopecks, Russian, old mint; 3 ditto; 2 ditto; 1 ditto; 5 ditto, new mint; 3 ditto; 2 ditto; 10 ditto, penny, Finnish; 1 ditto.

In reference to presentation No. 5, Mr. M. Allport remarked that these enormous mussels (which measure eight inches in length, and the same in girth are of a different species to the small common kind. They are remarkable for having a disk-like termination to the fibres of the byssus, several of which fibres are seen to be attached to the external surface of the shell. This species is found in mud in deep water, and specimens have been obtained from Southport and Spring Bay, as well as in the harbour.

Dr. Agnew then referred to the subject of the red spider of the hop, which he had brought under the notice of the Fellows at the last monthly meeting. As he then feared, he had not been able to procure from Sir R. Officer any better specimens of the insect, owing no doubt to the lateness of the season. On microscopic examination, however, of those sent they were found to be identical with the *Acarus telarius*, as figured in McIntosh's Book of the Garden, vol. 2, p. 77; although a later authority gave it the name of *Gamasus telarius*—an allied genus of the same great class, *Arachnida*. It is oviparous, and many broods are hatched during the season. The ova are probably for the most part deposited on the under surface of the leaves, whence the young when hatched can extract nourishment, but it is possible some may also be deposited in the bark of the hop poles, or even in the ground (as suggested by Mr. M. Allport), where the animals themselves are found in great numbers. The presence of the pest is attempted to be accounted for in two ways. Some think the hop itself from exposure to high winds, from scant supply of water or manure, or from other causes, first becomes sickly, and thus favours or provokes the development of the spider. Others think the fault is not in the plant in the first instance, but that under some peculiar and unknown influence, whether atmospheric or telluric, or by consent of both, vast developments of animal life take place at certain periods in a manner not yet accounted for. We have all seen plagues of green beetles, aphides, and caterpillars, and again we read of locusts, grasshoppers, etc., appearing in one year in overwhelming numbers, and in the next being almost altogether absent; and as these visitations take place without any apparent disease having previously existed in the plants destroyed by them, the inference was in favour of the latter view, viz., the primary development of animal life, and with this he (the speaker) was inclined to agree. In either case the effect would be the same; the weak and sickly plants would first yield to the attack of the enemy, whilst the strong and healthy would make a struggle, in many cases a victorious one, for existence. By the assistance of Mr. Roblin he had mounted specimens of the acari from the hop, from some hot house plants, and from the apple tree. For the last, which was accompanied with several ova, he was indebted to Mr. Stephens, who had paid a good deal of attention to the subject. These were placed under the three microscopes now before the meeting, and the Fellows could examine them for themselves. All were evidently of the same genus, which also embraced the parasite of the itch in man, and of the scab in sheep, etc. As to remedial measures, he could scarce offer any suggestions. As a matter of course, seeing that the healthy plant alone had a chance of resisting the destroyer, every suitable hygienic measure should in all cases be adopted. Due shelter from winds should be afforded. If the ground was found to be exhausted of any necessary chemical element, this should be restored, and proper quantities of manure and water furnished. From the numbers of the animals he had seen in the bark it was evident the poles should be carefully deprived of their bark, and it would probably be advisable to soak them in tar before setting them up. This could be done very cheaply, by means of rude wooden troughs of the same length as the poles, as coal tar could be procured at a nominal price from the gas works. The poles would thus be no longer a nidus for the parasite. As to any application to the plant itself, it was difficult to imagine how it could be effected as it was impossible to reach by any means at our command, the under surface of the leaf where the insect and the ova were chiefly found. The soil itself, however, as has been already noticed, was greatly infested, and here the same agent, sulphur, which was so noxious to the acarus (itch) in man and in sheep (scab) naturally suggests itself, as a possibly effective application. A pound of sulphur mixed with a pound of quicklime, might be boiled in a gallon of water for half an hour. When cold, the clear liquor to be diluted with water in the proportion of about one to sixty. This, by means of a watering-pot, would be of easy application, and if found to answer, would probably be as cheap as any other remedy, as sulphur, if in large demand could, he was informed, be obtained in any quantity, and at a very moderate price from New Zealand or its vicinity.

Mr. M. Allport remarked he had been speaking on the subject a few days ago to Mr. Wright, who informed him that sulphur had been tried at home, but was decidedly objected to as it was found to be injurious to the plant, although it was made use of with advantage in the preparation of the hop for market.

Dr. Agnew did not know anything of the matter practically, but thought if the experiments made at home were not conclusively adverse to the sulphur, it would be well worth trying it in the manner indicated, if only on a small scale, and on a few plants in the first instance. (As tobacco is noxious to the parasite and can be grown so cheaply, would it not, in the case of so valuable a plant as the hop, be worth a trial in the form of a very dilute decoction applied in the same manner as suggested for sulphur? If the pest were treated vigorously by either of these means, on its first appearance, even at the risk of injuring some of the plants, a great discouragement might be given to its further progress, and thus the nuisance be at least abated if not abolished.)

Mr. Davies considered the subject just treated was one of considerable interest, and suggested that the remarks by the honorary secretary should appear in the form of a paper. Dr. Agnew promised he would at all events notice the discussion at length in the official report of the proceedings.

Mr. M. Allport said: Mr. Chairman and gentlemen, at the risk of wearying you with the frequent recurrence to one subject, I must again refer for a few moments to the small salmonoid first sent to England. By the mail before last, Sir Robert Officer received a letter from Mr. Youl, which contains much that will interest the Fellows of the Society, especially as it tends to prove, as I have long suspected, that the difficulty of distinguishing between the smolt of the true salmon (*Salmo salar*) and the smolt of the sea trout (*Salmo trutta*) is very great. Mr. Youl says:—"I brought the little fish home from Dr. Günther's, and carefully examined it myself with my son-in-law, a medical man. We did this first with the description of the different varieties of the salmonidæ and directions given by "Yarrell" for distinguishing them, but not being able to come to any decision we went to a fishmonger, and upon carefully comparing it with a full grown salmo salar, concluded that upon the whole it was a salmon or sea trout, *Salmo trutta*, of Linnæus. After this I took the fish to Mr. J. K. Lord, the principal editor of *Land and Water*, a person fully competent to give an opinion, and with whom I had a personal acquaintance. Upon examination Mr. Lord stated his belief that it was a true *Salmo salar*. I asked him to examine it again, which he did in my presence and with his pocket microscope, when he again stated his belief that it was a true *Salmo salar*, but said if I would leave him the fish he would take time and give it a more careful examination; this I did, and upon seeing him again he said that he had altered his opinion and thought it was a salmon or, sea, trout. I then told him for the first time that the fish came from Tasmania, and that Dr. Günther had pronounced it to be a salmon trout Mr. Lord at the same time assured me that he had never heard anything about the fish until that moment, and that his opinion was formed without any knowledge of where the fish came from or that anyone had given any opinion about it. He also mentioned that at the age of the fish it was most difficult in his opinion to decide positively to which of the two species it belonged. I think it right to mention, that after leaving the fish with Mr. Lord I went to one of the largest fishmongers with my "Yarrell" and microscope, and was fortunate in seeing and examining three beautiful sea trout weighing from 1½ to 3½ lbs., and certainly I must confess that the teeth on their vomer corresponded exactly with those of your fish. I cannot, however, I must candidly own, make up my mind that it is a salmon trout, because if so it must have been as you well know at least 3 years and 5 months old when it was caught, and therefore ought to be half as large again as it is. You will note that Mr. Lord at first, and after a careful examination, pronounced it to be a true salmon. It was not till after a further and more extended comparison that he altered his opinion; it is, therefore, not to be wondered at if you and Mr. Allport should prove to have formed an erroneous opinion upon so difficult a point." It is a law of nature that the species and varieties of one given genus of animals resemble one another far more closely in the early stages of their existence, than they do when arrived at maturity. No birds differ more in the mature plumage than ducks, yet there are dozens of species that no naturalist could determine during the first few weeks of their lives. I do not mean to say that a Tasmanian black duck of a fortnight old could not be distinguished from an English wild duck of the same age, if they were placed in juxtaposition; but that they resemble one another so closely, that it would be next to impossible to determine to which species either belonged, if examined alone. And no reference to a fully mature duck or drake could be of any service in solving the difficulty. Amongst the large carnivora in the genus felis we find the tiger, the lion, and the panther, each perfectly distinct when full-grown, yet the cubs all exhibit the striped skin, which is only found in the mature tiger, the stripes being lost in the lion, and changed to spots in the panther. Instances might be given from every division of the animal kingdom, but to come to fish, the genus Thyrsites contains two of our commonest fish, the king-fish and barracouta, and no one who has turned his attention to the subject could have any difficulty in distinguishing between them when grown, yet both Mr. Giblin and Mr. Buckland (either of whom it would be difficult to puzzle with a Tasmanian fish), would find it hard to determine the species of one or the other when four or five inches long. From this natural law, it follows that the more closely species approach one another when mature, the more difficult is it to distinguish between their young; and as the mature salmon more closely resembles the salmon trout than the king-fish resembles the barracouta, I should expect to find that the difficulty of distinguishing the one smolt from the other was enhanced. And if we turn to Mr. Youl's letter, we find Mr. Lord, from the outer appearance of our fish, at once pronounced it a true salmon, and, after re-examination again pronounced it a true salmon, but, after having the fish left with him, changed his opinion. Unfortunately, Mr. Lord does not tell us why he changed his opinion; but, from Mr. Youl's observations as to his own reason for thinking the fish a salmon trout, it is all but certain they were both puzzled by the presence of the vomerine teeth in our fish, and in the mature salmon trout (*Salmo trutta*) whilst such teeth were absent in the mature salmon (*Salmo salar*). And here I must trouble you with two short extracts from "Yarrell," who, at pages five and six, says:—"The teeth of the salmon are short, stout, pointed, and recurved. As stated in the generic characters, they occupy five situations at the top of the mouth: that is, a line of teeth on each side of the upper jaw, a line on each palatine bone, with one line on the vomer between the palatine bones when young; but the salmon loses a portion of the vomerine teeth during the first visit to salt water. I have observed that some specimens of the migratory or sea trout carry their vomerine teeth longer than the salmon; and those trout which do not migrate, appear to carry their vomerine teeth longer than those trout which do migrate. The teeth on the vomer of the salmon, when the fish is old, seldom exceed two or three in number, sometimes only one, and that placed on the most anterior part. The salmon has, besides these, two rows of teeth upon the tongue, and one row along the outer upper edge of each lower jaw-bone." In speaking of the teeth of the salmon trout, at page 79, Yarrell says:—"The teeth are more slender, as well as more numerous, than in the salmon or grey trout; those on the vomer extending along a great part of its length, and indenting the tongue deeply between the two rows of teeth that are there placed, one row along each side." Does not this at once reconcile the presence of vomerine teeth in our specimen with its being a true salmon smolt? The Fellows of this Society well know how much we are already indebted to Mr. Youl for his unceasing exertions in this undertaking, and the Salmon Commissioners had no right to expect him to give up more of his valuable time for their advantage, still I hope that before the season was quite over our fish may have been compared with an undoubted salmon smolt from Stormontfield which had reached the same stage of development, because I believe that vomerine teeth will be found identical in the two specimens.

Mr. Davies, in referring to a paper by Mr. Barnard (read July, 1868) on the Esparto grass, mentioned that the Hobart Town *Mercury* newspaper had been printed for several months on paper manufactured from that material; and asked if Mr. Barnard had acquired any fresh knowledge on the subject.

Mr. Barnard stated that since the paper referred to by Mr. Davies, he had laid further information on the subject before the Society (July, 1869), from which it was evident that the cultivation of the grass could not be attempted in this colony with any chance of profit or success, and he had taken no further interest in it.

Mr. M. Allport observed it was well known that no vegetable product which required cultivation could be profitably grown for the manufacture of paper. Even if the waste lands of the colony were sown with Esparto grass seed, as had been suggested, this climate would be unsuitable for the plant.

On the motion of Mr. Justice Dobson, a vote of thanks was given to Mr. Allport, Dr. Agnew, and the donors of presentations, and the meeting separated.

JULY, 1870.

The monthly evening meeting of the Society was held on Tuesday, the 12th July, J. Barnard, Esq., in the chair.

The following gentlemen, who had been put in nomination, were, after a ballot, declared duly elected members of the Society, viz.:—G. Wilson, Esq., J.P., Hobart Town; C. Hazell, Esq., J.P., Carlton; R. V. Legge, Esq., J.P., Cullenswood; and Hon. J. Aikenhead, Esq., M.L.C., Launceston.

The Secretary submitted the following returns:—

1. Visitors to Museum during June, 629.
2. Ditto to gardens during June, 1208.
3. Plants, &c., received at gardens.
4. Ditto sent from gardens.
5. Times of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
6. Books, &c., received.
7. Presentations to Museum.

Meteorological Returns:—

1. Hobart Town—From F. Abbott, Esq., Table for June.
2. Port Arthur—From J. Boyd, Esq., ditto.
3. Westbury—From F. Belstead, Esq., ditto.
4. New Zealand—From the Government, ditto for May.
5. Adelaide—From C. Todd, Esq., ditto for January.

The presentations to the Museum and Library were as follows:—

1. From Mr. H. Turner—A Persian or Hindoo copper coin.
2. From Mr. W. Maum—A copper medal (apparently Masonic), found at Clarence Plains.
3. From Rev. H. D. Atkinson—A Spider Crab from Three Hut Point.
4. From Mr. Ikin—12 specimens Crustacea.
5. From Mr. A. Wood—A curious Crustacean from Blackman's Bay.
6. From Mr. Brand, Oatlands, per the Hon. J. Whyte, Esq.—A fœtal wallaby.
7. From R. C. Read, Esq , New Norfolk—A native devil (*Sarcophilus ursinus*) with three young in pouch.
8. From Mr. W. Pelham—A curious fish from beach at Kangaroo Point.

[This fish belongs to the *Lophiidæ*, and is figured and described under the name of *Chironectes politus* in the Zoology of the Erebus and Terror (*Plate IX.*, *page* 16.) Of the genus *Chironectes* Cuvier remarks:—"These fishes, from the peculiar conformation of their pectoral fins, can creep on land almost like little quadrupeds. The pectorals, by reason of their position, perform the office of hinder feet. They can live out of the water for two or three days."

9. From H. M. Hull, Esq.—Shells and corallines from Warrnambool.

The Secretary, after referring to the visitation of caterpillars with which various parts of the colony were afflicted about six months ago, mentioned that he had placed several of them under observation for the purpose of determining their future development. He now brought under the notice of the meeting the empty case of a chrysalis which formed on the 18th of January, and a moth which was produced from it on the 14th of the month following. The moth was apparently an Agrotis, and therefore the of the same genus, but probably not the same species, as the one *(Agrotis vastator)* the caterpillar or larva of which was so destructive to the crops and pastures of N. S. Wales in 1867. From the chrysalis of our caterpillar one observer (Mr. H. Nelson) has expressed his conviction that flies have in some instances been produced. If this was the case it must have been due to the parent fly depositing its ova in the chrysalis, the substance of which would afford nourishment to the strange larva, though of course it would itself be destroyed.

A paper by Mr. Legrand, on "The Land Shells of Tasmania," with a list of new species recently discovered by him was read by Mr. Stephens. At the conclusion of the paper Mr. Stephens passed a high eulogium on Mr. Legrand, for the great zeal and devotion with which he had pursued this branch of natural history, at a cost he could ill afford, and with little, if any, direct benefit to himself. If they had some kindred spirits to work out other branches of natural history, valuable specimens would rapidly accumulate, and their museum would soon be rich indeed.

Mr. Barnard read the following letter from Mr. John Walker to Mr. Nowell, the Government statistician, and its enclosed communication from Mr. Arnold Baruchson, on the manufacture of beet-root sugar:—

32, Lansdowne Road,
Notting Hill, W., London,
19th March, 1870.

My Dear Sir,—I suppose that long ago you heard of my intended trip to Tasmania, and my unfortunate voyage, as the vessel was wrecked about 100 miles from Rio de Janeiro, and eight of the passengers lost and my wonderful escape, without any serious detriment to my health. I am, however, at present determined not to attempt to take another voyage at my period of life.

I see by the newspapers the subject of beet-root sugar has engaged the attention of some of the colonists, and that James Barnard, Esq., has taken an active part, so that the members of the House of Assembly have voted a gratuity to any one who would first produce 200 tons of sugar from beet-root grown in Tasmania.

In some of the letters I wrote on the subject, I took a different view, and stated that an Act should be passed to protect the producers from any duty for a stated number of years. I think I sent a letter from Mr. A. Baruchson, of Liverpool and Magdeburg, from whom I received part of the seed I sent out, but I regret to say few tried it, and as it was a very dry season, those who did, did not succeed. I tried a little in my garden here, and it answered well. I let some grow, and it went to seed better than I expected.

I now send you a letter which I received from Mr. Baruchson on the 7th instant, and you can use it as you think best. I see by an Act of Council distillation is to be allowed. I do not think it would pay if made from malt, as one bushel of malt would cost from 8s. to 10s., and would only produce two gallons of proof spirit; and the price of the rum exported from London is from 2s. 2d. to 2s. 4d. per gallon.

As there is a considerable quantity of molasses from beet, as well as from other sugar highly refined, it might be used for distillation; but when I wrote I was aware that no distillation was allowed. I suggested that the molasses should be mixed with hay, made into chaff, as all kinds of cattle are very fond of it.

I was at Mr. Duncan's beet-root manufactory on the 3rd March, 1869, and saw his machinery at work, but as it was the first season, and the machinery not ready in time, the root was deteriorated, it should have been all used in January. The machinery was very inferior to what I saw in France and Germany.

At one "fabrick," as they call it in Stuttgart, in Germany, they rent land, and produce all, or nearly, the beet-root they require, and never dispose of the pulp, but keep it in large pits, 150 feet long and 20 feet broad, and cover the pulp with the stalks of maize, and then with earth sloped like the flat roof of a house, and sow maize on the earth, as the pits are all adjoining each other, and as the pulp ferments, the heat forces on the maize, and they get an excellent crop at an early season. They keep 200 bullocks and about 140 milch cows, and feed them with the pulp and maize stalks, and get a large quantity of excellent manure to keep the land in good order. When five or ten of the bullocks are fit for the butcher, they are sold, and their places filled up with lean beasts, purchased at a low price. The milk is sold to milkmen in the town, and as Stuttgart is a large place, there is a good demand.

It is a noble "fabrick," and the owners, Germans, remarkably civil. As my daughter lives near it, I can see it whenever I go there. (See page 5.) At Stuttgart, when I was there last year the concern was so successful that they, for an increase of capital, then formed it into a company, and all was going on prosperously. They have to pay duty on all the sugar they make, both in Germany and France, and seem to be very prosperous. At and about Douay, they have all the means and appliances in the best order, and wherever you travel you see little but crops of beet-root, and they get a full supply, and dispose of the pulp instead of keeping it to feed cattle.

You will see by the letter I enclose, that the machinery is very elaborate and expensive, and for many reasons the manufacture could not be commenced on a small scale with any prospect of success, nor is there any person in Tasmania able to make the attempt, it would require at least ten Germans who thoroughly understand the process, and as the work can only go on in the winter months, say in November, December, and January, there must be a relay of competent men for boiling and the other operations night and day for three months, as any delay would probably be at a loss of at least £500.

On the Continent they have this advantage, that the men, women, and children employed, could not procure any other work in the winter months, as the climate is far more severe than in England, and they get people at very low wages. There may be employed in large manufactories about one hundred and fifty persons in cutting off the tops, washing, and other parts of the work. A large quantity of water is required, and at least two steam engines of, say from twenty to thirty horse power, and at least four steam boilers, as the whole system is carried on by steam. The so-called coppers have copper spiral tubes in them, three inches in diameter, and are very expensive.

There must be a proper kiln for burning the limestone used in the process, and the fume from the kiln is utilised in order to cause the lime which has been added to the extract to subside to the bottom. When this has all been deposited, it is thrown out and makes excellent manure. There is also a very considerable quantity of animal charcoal (burnt bones), used to discolour the extract, and make it as pure as clean water. This is used in all sugar houses, even if the sugar is from the canes. It should be made on the premises, and reburned there also. This can be seen at Sandridge, and on a small scale at our brewery in Hobart Town.

I fear I will not ever see or hear of a beet-root sugar manufactory, during my few remaining months or years, in Tasmania.

Make any use you please with this and Mr. Baruchson's letter.

I am, my dear Sir,
Your's truly,
JOHN WALKER.

In the enclosed letter Mr. Baruchson calculates that from £60,000 to £100,000 would be required to establish in England a manufactory and distillery on a scale large enough to ensure success.

Mr. Justin Browne doubted if the beet could compete in these colonies with the cane sugar, and it was to the disadvantage of the former that it was only used in the form of lump, or refined, not as brown sugar.

Mr. Barnard stated that on his visit to New South Wales, he had seen some very good brown sugar from the beet, and had presented a sample to this Museum. He knew that Dr. Coverdale had grown a quantity of the root at the Queen's Asylum, and was now, and in order to produce the sugar, only waiting to be supplied with a machine which was found to work successfully in New South Wales, and the cost of which would be about £50. A friend of his in Sydney who has been engaged in the manufacture, was [illegible] the subject, and they would probably bear [illegible] of the approaching great agricultural [illegible]

Mr. [illegible] could be manufactured profitably at [illegible] South Wales producer, as [illegible] of root crops, and he had a rival in the cane at his very door. It was to be recollected that they could not hope to have any market for the sugar out of the colony.

Dr. Agnew, considering the risk and uncertainty incidental to the establishment of this industry, requiring, as it appeared to do, such a very large amount of skill, capital, and experience for its successful conduct, thought as it was being tried apparently in a very economical manner, on a small scale, in New South Wales, it would be better to wait and observe the result of that experiment. If it succeeded at all in that colony, no doubt the great superiority of this soil and climate for the growth of root crops, would make its success in Tasmania still greater in a financial point of view.

Mr. Justin Browne observed, as apropos to the present discussion on colonial enterprise, that he had received by last mail a letter from a merchant in Madras, directing his attention to the tenders just issued by that Government for Australian preserved meat for the Indian army, &c. The opening up so vast and profitable an industry as this, both in the Home, and Indian markets, was one of the happiest omens for the future of these colonies.

The proceedings closed with the usual vote of thanks to the donors of presentations.

AUGUST, 1870.

The usual monthly meeting of the Society was held on the evening of Tuesday, the 9th of August, T. Giblin, Esq., in the chair.

Among the members present were Messrs. M. Allport, Justin Browne, G. R. Napier, H. J. Buckland, C. Gould, J. M. Clarke, T. Stephens, S. P. H. Wright, L. R. Castray, Dr. Agnew, Hon. Sec., Rev. H. D. Atkinson, and Dr. E. S. Hall; Dr. H. B. Hinton, of H.M. Bengal Army, was also present as a visitor.

The Hon. Secretary submitted the usual monthly returns, viz:—

1. Visitors to Museum during July, 767.
2. Do. to gardens do., 1152.
3. Plants and seeds received at gardens—From Messrs. Taylor and Sangster, Melbourne, 26 plants. From Mr. C. F. Creswell, 24 packets imported flower seeds.
4. Plants, &c., sent from gardens:—To H. B. Laurie, Esq., Encounter Bay, Adelaide, 100 plants of white mulberry. To Messrs. Todd and Co., Dublin, 10 packets seeds. To Military Barracks, 36 sycamores. To Mr. J. Archer, for Church grounds, Longford, 14 Coniferæ. For grounds of St. Michael's Church, New Norfolk, 54 plants. For Castray Esplanade, 32 pines. For Domain, 120 plants. For Government House grounds, 50 plants.
5. Time of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and periodicals received.
7. Presentations to Museum.

Meteorological Returns.

1. Hobart Town, from F. Abbott, Esq. Table and summary for July.
2. Port Arthur, from J. Boyd, Esq. Table for July.
3. Melbourne, from the Government Astronomer, Tables and Notes for May and June.
4. Sydney, from the Government Observatory. Printed table for February, March, and April.
5. New Zealand, from the Government. Abstract tables from various stations for April.

The presentations to the Museum were as follow:—

1. From H. M. Hull, Esq.—Nest of white shafted fantail *(Rhipidura albiscapa.)*
2. From Mr. G. Gulliver, Melbourne—125 specimens of Australian Coleoptera, named.
3. From Captain Robinson, barque Free Trader—A sample of bituminous coal from a new seam at Newcastle, New South Wales.
4. From Mr. Spurling—A specimen of *Chimæra Australis* caught in the Derwent.
5. From Salmon Commissioners—A Salmon Parr from the breeding ponds, River Plenty.
6. From M. Allport, Esq.—Prawns taken from stomachs of Rock Cod *(Gadus sp.)*.

Mr. M. Allport exhibited a young salmon (presentation No. 5), about four years old, from the breeding ponds at the Plenty, which had never been allowed to visit the salt water, as it illustrated a peculiar circumstance in reference to the development of the fish, which was stated in detail at the meeting of the Society three months ago. It was then shown, from the proceedings of the Zoological Society of London for 1868, that some salmon parr were prevented from going to sea at their due time, that they still assumed the silvery scales of the smolt but afterwards lost them, reassuming the parr markings. This change went on for two or more years, the fish becoming during the process sickly, stunted in growth, and finally perishing. The specimen now shown was very like those figured in the Zoological Society's Transactions, the parr markings were very distinct, and the stunted and misshapen appearance of the fish was unmistakeable.

Presentation No. 6 was interesting, as, according to Mr. Allport's observations, nothing of the kind, as far as numbers were concerned, had ever occurred till last year. Since that time large numbers had been found in the stomachs of rock cod. This was a proof of the existence of great quantities of these prawns in our waters, and a systematic search would probably secure this delicacy for our market. The same might be said as to the large edible crabs, numbers of which were formerly captured on our coasts when the whales were brought on shore for the extraction of the oil. It was to be hoped that fishing as practised at home would be tried here for both these crustaceans.

The SECRETARY called attention to the following publications lately received from London, viz. :—Proceedings of Zoological Society of London, Journal of Linnean Society, Journal of Geological Society, Journal of Royal Asiatic Society, Journal and Proceedings of Royal Geographical Society. Presented by the various societies. Also a complete set of the reports of the Paris Exhibition of 1867, the gift of the Society of Arts, per Dr. Milligan.

The following books, for which the Society subscribes, were also received in the same parcel :—Ray Society's vol. for 1868, "Vegetable Teratology," the Transactions of the Society of Arts for 1868-9, and the report of the British Association for 1868.

The Secretary read the following extracts from a letter he had received by last mail from Dr. Milligan :—

"London, 17th June, 1870.

"By the Ethel, Captain Harmsworth, you will receive a parcel containing a copy of each of the two books lately published on the Aborigines of V. D. Land by Mr. James Bonwick, formerly holding some position on the staff of the education department in Tasmania, and first known to me as an author by his having applied to me for scraps of information, touching topographical peculiarities, and geological conditions in sundry parts of the colony, which he embodied in *school geographies*, which he then brought out. I forget what I said (in a former letter) about the books which I have sent to you, but whatever it was it would scarcely be in their praise, for I consider that a spirit most unfriendly and disingenuous as regards the early colonists pervades the whole production. It is a great pity that he has not related a few of the numberless attempts which were made by the more respectable and intelligent of the early settlers to educate and improve the children of the aborigines, and the absolute failure of success in ninety-nine cases out of every hundred. This would have been *only fair*.

* * * * * * *

"In the same parcel you have three packets of seeds which I have procured for the Royal Society's gardens, from the Secretary of the Royal Horticultural Society here : the several packets are respectively contributions to the flower and kitchen departments of the gardens, and to your arboretum. Besides which I have sent one packet of seed of the plant which yields the well known and valuable fibre of which the grass cloth of China and India is manufactured. Should you succeed in maturing it, and I can perceive no natural bar to your doing so, you will confer a valuable boon on the colony, seeing that there must arise an unlimited demand for such a fabric (as grass cloth) on the continent of Australia, if indeed it does not already exist."

[This plant is now growing in the public gardens, and Mr. Abbott, the Superintendent, states that it is readily propagated from cuttings. It also grows freely in Queensland, where, however, some difficulty has hitherto been experienced in the separation of the fibre for commercial purposes.]

Dr. Hall brought under the consideration of the meeting the desirability of procuring direct from Japan a quantity of the seeds of the Umbrella Pine, which Fortune, the Botanist, describes as such a magnificent tree for shade and the ornamentation of parks, &c. He says:—" A whole company of soldiers could bivouac under a full grown tree safe from rain and sunshine." The Society obtained some plants from England at great cost some years ago, but only one has survived. Dr. Hall had no doubt the seeds would grow better here even than in England, and stated that Mr. Assistant Commissary General Castray had informed him he could procure them for the Society direct from Japan. Mr. Castray kindly undertook to do so, as it was the wish of the meeting.

Mr. Gould read a paper on " The habits of the large crayfish (*Astacus sp. ?*) of the northern rivers of Tasmania." The principal points adverted to were the local character of its distribution, a comparison with the same of the blackfish, a discussion upon the nature of its food in regard to the supply of the latter regulating the distribution of the species, a comparison with allied forms in the Northern Hemisphere, and a citation of a few other examples of allied, identical, or representative species, found in the two hemispheres, and impressing the conviction that such species had not originated in independent centres, but mutated under equal conditions, concluding with a reference to examples of species, tending to show that Tasmania had been connected with the main land, within a late geological period, even within the term of life of existing species.

Mr. Allport observed, as to the food of this Astacus, that although large quantities of dead wood might be consumed, as noticed by Mr. Gould, he thought some animal food must also be taken.

Mr. Gould, in reply, quite agreed with Mr. Allport in supposing that they ate animal food when they could get it, but this was much seldomer than generally imagined ; that in regard to the Unio, which had been supposed to be the staple article of their food, it was his belief that it was entirely absent from many of the rivers inhabited by the Astacus. Neither did he think that the crayfish was by any means so destructive to the blackfish as imagined ; they must have great difficulties in capturing them, and the blackfish did not seem to exhibit any of that fear and avoidance of these crustaceans, which would naturally be induced if they had been habitually preyed on by them.

In reply to Mr. Stephens, who wished to know if the crayfish was found in rivers east of the Tamar, Mr. Gould mentioned the Piper and Forrester Rivers, being from his own personal observation well stocked with them.

Mr. T. Giblin stated that he had brought, about four years ago, from the North several living specimens of these crayfish, much larger than that now before the meeting, and had liberated them in the Derwent, about three miles above the falls at New Norfolk, but from that time he had never heard of them, and it was not possible to say with certainty whether they had succeeded or not.

Conversation having taken place as to the range of habitat of some of our fish, Mr. Giblin mentioned that the so-called cucumber fish (*Prototroctes muræna*), of New Norfolk was at one time, and probably still is, plentiful in the Yarra. Mr. Gould observed that the presence of these and other fish in the rivers on opposite sides of Bass's Straits, was another proof that at some former period Tasmania and the Australian mainland had formed one continent.

A vote of thanks to Mr. Gould, Dr. Milligan, the other donors of presentations closed the proceedings.

ON THE LAND SHELLS OF TASMANIA,

By W. Legrand.

When Woodward classed the Terrestrial Mollusks of Tasmania, with those of Australia, south of the tropic, but little was known of them. At the time he wrote the number of described species of Helix was six, two of which have since proved to be identical, and two others doubtfully Tasmanian, thus reducing the number to three.

Since that time much work has been done, the number now described numbering over fifty. Tasmania has a fauna peculiar to herself, more nearly related to that of the Northern Island of New Zealand than Australia. Take the section Videna, Australia proper does not possess a single species, while Tasmania has five, Sinclairi, Hamiltoni, Launcestonensis, dubitans, and a new species lately discovered by Mr. Gould, at the Leven, proposed to be named DuCani (next to Launcestonensis, the largest Helix yet found here.) If the doubtful species bisulcata be admitted, the number is six. New Zealand has two—Dunniæ and Greenwoodi. This is peculiarly an island section, the greater number being from the Solomon's. Our number is nearly equal to those from all other places together.

The nearest we have to the great New Zealand Busbyi (except with Albers we admit Vitrina Milligani, a classification which must have been made from the shell alone, the animal being essentially different) is fulgetrum. A shell found at Ringarooma, named by Brazier, Kingi comes very near. Victoria has one belonging to the same section—Helix atramentaria—which comes between, and is the largest landshell yet found in that province.

New Zealand has several of the section Conulus. We have one, H. parvissima, Cox, which comes very near that, or such shells as H. alpha and beta, Pfr. Of the sections Discus. Patula and Hyalina, we have about the same proportionate number as New Zealand and Australia, and of the section Hemiplecta we have one, possibly two. This is also an island shell. Like New Zealand, the greater part of our Helices are minute.

Of the section represented by Allporti, Cox, there are six or eight species. For beauty of colouring must be noticed Tasmaniæ, fulgetrum, Juliformis, Nelsonensis, and ruga; for peculiarity of form parvissima may be mentioned; and for beauty of shape Stephensi and Kingstonensis must not be passed by.

One very fine shell (H. Daveyensis), the largest yet found belonging to the section Discus, coming from Port Davey, deserves particular notice.

Austrinus is more noticeable from its habitat than from the shell itself, which is allied to Allporti. It comes from the extreme south of the island, near South Cape Bay.

We possess three introduced species, Morti, Sydneyensis, and Alexandræ, all from New South Wales, and most probably brought in mould with plants.

Of our two species of Bulimus, the first well known one B. Dufresni, belongs to the same section (Caryodes) as a South Australian species, Angasianus. The second B. (Mesembrinus) Tasmanicus, Pfr., is nearly allied to an Australian species, Kingi. Nothing like either of these has yet been described as from New Zealand. We have no representative of such shells as Shongi. Our two Vitrinas belong to the section Helicarion; one is also found in South Australia, and probably other parts of the continent. The other, the fine V. Milligani, is found only on the western side of the island.

Our one species of Succinea is also common to Australia.

We have neither Pupa, Pupina, or Balea, all found in North and North-eastern Australia, or Truncatella, which is very plentiful in South Australia. Angas gives us credit for a Blanfordia, I never found it or heard of it here; the shell is however so minute that it might easily be passed by.

The materials yet collected are not sufficient to fix the geographical limits of the different species. Subjoined is a list of all yet described species :—

HELIX.	
Launcestonensis	Reeve
Same { Sinclari	Pfr.
shell { bombycina	,,
bisulcata ?	,,
subangulata ?	,,
Diemensis	Cox
Le Grandi	,,
Hamiltoni	,,
Hobarti	,,
lampra	Pfr.
lamproides	Cox
minima	,,
similis	,,
Tasmaniæ.	,,
Wellingtonensis	,,
Allporti	,,
medianus	,,
helice	,,
cœsus	,,

HELIX.	
austrinus	,,
occultus	,,
ruga	,,
marchianæ	,,
Stephensi	,,
Agnewi	,,
plexus	,,
dubitans	,,
vigens	,,
fulgetrum	,,
Juliformis	,,
Ramsgatensis	,,
Halli	,,
Daveyensis	,,
trajectura	,,
tranquilla	,,
mixta	,,
parvissima	,,
Kingstonensis	,,

HELIX.	
cœpta	,,
positura	,,
vexanda	,,
Nelsonensis	Brazier
dispar	,,
Onslowi	,,
neglecta	,,
Curacoa	,,
Ricei	,,
ammonitoides	,,
rotella	,,
Kingi	,,
Fordei	,,
DuCani	Cox
Introduced :—	
Sydneyensis	,,
Morti	,,
Alexandræ	,,

BULIMUS.		VITRINA.		SUCCINEA.	
Dufresni	Leach	Verrauxi	Pfr.	australis	Fer
Tasmanicus	Pfr.	Milligani	,,		

Helix	52	
Introduced	3	
	—	55
Bulimus		2
Vitrina		2
Succinea		1
		—
Total		60

ON THE DISTRIBUTION AND HABITS OF THE LARGE FRESH-WATER CRAYFISH *(ASTACUS SP.)* OF THE NORTHERN RIVERS OF TASMANIA.

By C. Gould, F.G.S.

I trust that the members of this Society may be interested in a few remarks, which I have to make upon the distribution and habits of the large fresh-water Crayfish which is so common upon the north side of the island.

I am not aware that this has been specifically described by naturalists, although its unusually large size, abundance in certain localities, estimation as a delicacy for the table, added to its facility of capture and observation should long since have acquired for it that attention at their hands.

Leaving its determination, however, to those within whose province it belongs, it is my purpose, as a field naturalist alone, to offer the result of a few observations, and collate them with other facts connected with the natural history of the island.

And in the first place must be noted the remarkable representative resemblance in most points, excepting size, of this to members of the Genus *Astacus* of the Northern Hemisphere.

Here we have yet one more of the many numerous examples of a certain similarity in point of type, if not of close specific resemblance, obtaining under equivalent conditions between the forms of life at one extremity of the globe, and those existing at the other, while strongly distinctive, but often gradational peculiarities attend the forms controlled by the opposing conditions of the intermediate tropical regions. Hence the difficulty of referring the existence of such representative or affinitive types to independent acts of creation—and the apparently more sustainable solution by the theory of biological metamorphosis.

To instance 1st. The Rats and Mice among mammals; 2nd. Plovers, Eagles, Snipes, Ducks, Owls, and Thrushes amongst birds; 3rd. The Locusts and Painted lady and Admiral Butterflies amongst insects; 4. The Ferns and Mosses among plants, will be sufficient for my present purpose.

I may next remark upon the limited nature of its distribution, as worthy of more than passing notice; occurring more or less abundantly in all the rivers upon the northern side of the island, and being entirely absent from those upon the south, it follows closely in its distribution that of the Blackfish, with which it is always associated in the rivers falling into Bass' Strait, with the one exception of the Esk, from which, as far as my knowledge serves me, it is absent—while, on the other hand, the *Astacus* alone is met with in the tributaries of Macquarie Harbour. The range of these two then the *Astacus* and the Blackfish, is nearly the same, neither of them being found within the rivers flowing to the east or south coasts of the island. Yet there is nothing in the habits or the necessities of the *Astacus* which would explain its presence in, or absence from, respective rivers; although preferring deep still pools and reaches, in which it may shelter beneath submerged and partially decaying timber, it is also commonly found in the shallower and swift running portions, and there are few of the streams adverted to from which it is absent, which do not, as far as may be judged from appearance, offer in some portions of their course, the kind of harbour, and if one may use the expression, cruising ground to which the *Astacus* is familiar, while the myrtle shrouded waters of the higher portions ot the Huon identically resemble the upper portion of the rivers to the northward, in which both the black fish and the *Astacus* abound.

As to its ordinary food much misapprehension has hitherto, in my opinion prevailed.

The eagerness with which it fastens on any animal bait, the threatening aspect of its general appearance, and the enormous crushing power of the claws with which it is armed, have induced the belief that it mainly exists upon fish which it has captured, or the large species of Unio found in some of the northern rivers, and the absence of the latter from the southern ones, were considered a sufficient explanation of its being wanting also. This, however, appears to me to be erroneous, and from my observation I have concluded that the capture of fish or other animal prey by the *Astacus* is a rarity, and that as in many instances the Unio is entirely absent from the rivers which it inhabits this as a source of its food must be entirely disregarded. Indeed, to my great surprise, I found upon dissecting numerous examples of the *Astacus*, that the contents of the stomach consisted almost entirely of crushed and torn fragments of semi-decayed wood, and I have arrived at the conclusion that the main source of its subsistence are the slowly decaying stems and snags with which the timber bordered rivers are always encumbered.

Now, as the adaptation of the *Astacus* to certain localities in consequence of the presence of especial means of subsistence is untenable, the decaying timber abounding equally in the southern with the northern rivers, it becomes imperative to seek another solution, and we are thus led in considering the reputed identity of the Blackfish of this colony with that abounding in Victoria, the close similarity of the species of

Astacus here with that found on the same continent, the existence here of certain marsupial forms (Thylacinus and Native Devil) and of fossil remains of the same in caves in New South Wales, and in deposits of a late tertiary period, coupled with many resemblances in the vegetation of the two countries, which I hope to develope and comment on fully at some future period—to recognise as a fact that at some late period, so late indeed as to be within the term of existence of an animal species, a direct connection has existed between this island and what may be termed the mainland of Australia, and the examples quoted above, and many others which might be added to them, are but the remains of a fauna and a flora once common to the whole, and that the species of *Astacus* and other forms have probably extended southwards to their present position, and been arrested in their further progress by some physical difficulty which a more extended acquaintance with the geological history of the recent formations may reveal to us.

ROYAL SOCIETY.

SEPTEMBER, 1870.

The monthly evening meeting of the Society was held on Tuesday, September 13th, Morton Allport, Esq., in the chair.

The Secretary, Dr. Agnew, brought under notice the following returns for the past month :—

1. Visitors to Museum, 957.
2. Ditto to Gardens, 1199.
3. Plants and seeds received at, and sent from gardens.
4. Tench supplied.
5. Time of leafing, &c., of a few standard plants in Botanic Gardens.
6. Books and Periodicals received.
7. Presentations to Museum.

Meteorological Returns :—

1. Hobart Town, from Mr. F. Abbott, Esq., table and summary for August.
2. Westbury, from C. Belstead, Esq., ditto, ditto.
3. Sydney, from the Government Observatory, ditto for June.
4. Melbourne, from ditto, ditto, for July.
5. New Zealand, from ditto, ditto for May.

The presentations to the Museum were as follow:—

1. From Mr. Moir, junr., specimen of Alum from a cave near Mr. Moir's house, Brown's River Road.
2. From Mr. C. A. Gresley, 5 Rock specimens from River Mersey.
3. From Mr. Gibbons, chicken with three legs.
4. From J. Forster, Esq., part of Human Skeleton dug up at Hamilton.
5. From Mr. M. Allport, specimen of Schorl from Flinders Island. A lump of resin washed on shore at the same place. [This resin is probably the produce of the Oyster Bay pine, *Callitris Australis.*]
6. From James Scott, Esq., M.H.A., the cast skin of a Snake from Ringarooma.
7. From Captain Lloyd, per Mr. O. H. Hedberg, a shingle of Macquarie Harbour pine, from the gaol at Macquarie Harbour, built in 1826. [This specimen shows in a very striking manner the great durability of the wood. Although it has been exposed to the weather for a period of 44 years it presents no appearance of decay—the saw marks even being plainly visible—and on removing the surface with a knife the wood is seen to be perfectly fresh beneath.]
8. From the Gore Browne Testimonial Committee, two photographs of the testimonial presented by the colonists of Tasmania to Colonel (now Sir Thomas) Gore Browne, C.B., on his retirement from the Government of this Island.
9. From Mr. Philip, Franklin, part of Vertebra of Whale.
10. From Mr. S. H. Wintle, 20 geological specimens from New South Wales and Victoria, collected by himself; with a descriptive catalogue.
11. From Mr. M. Allport, two fish caught in the Derwent, off Sandy Bay. [These fish were unknown to the fishermen who caught them, but closely agree with one figured and described under the name of *Emmelichthys nitidus*, by Dr. Richardson, in the "Zoology of the

Erebus and Terror," page 47, plate 29. This fish was first discovered in Western Australia by Sir G. Grey.]

12. Two fish caught off the South East Coast of Tasmania. [These are also unknown to the fishermen.]

The Secretary requested special attention to the very liberal and valuable presentation of books before the meeting, from the American Government, the Smithsonian, and other scientific institutions in the United States, comprising the following publications :—

Smithsonian Contributions to Knowledge, vol. 15, 1867.
Ditto Reports for 1866-67.
American Patent Office Reports, 1863, vols. 1 and 2.
Ditto ditto, 1864, vols. 1 and 2.
Ditto ditto, 1865, vols. 1, 2, and 3.
Ditto ditto, 1866, vols. 1, 2, and 3.
Department of Agriculture, Washington, Report of, for 1866.
Ditto, ditto, monthly ditto, 1866-67.
Boston Society of Natural History, Memoirs of, vol. 1, part 3.
Ditto, ditto, Proceedings of, vol. 11, 1866-68
Ditto, ditto, Conditions and Doings of, 1866-8.
Portland Society of Natural History, Proceedings of, vol. 1, part 2, 1869.
Ditto, ditto, 6th Annual Report of Secretary of Maine Board of Agriculture, and Reports on Scientific Survey, 1863.
Ditto, ditto, 2nd Annual Report on Natural History and Geology, State of Maine, 1861.
Ditto, ditto, Reports of Commissioners of Fisheries State of Maine, 1867-8.
Essex Institute, Salem, Massachusetts, Proceedings of, vol. 5, Nos. 5 to 8.
Museum of Comparative Zoology, Harvard College, Cambridge, Mass.
Ditto, ditto, Annual Report, 1868.
Ditto, ditto, Bulletin of, Nos. 6 and 7.
Ditto, ditto, Contributions to Fauna of Gulf Stream, by F. de Pourtales, 1867-8.
American Academy of Arts and Sciences, Philadelphia, Proceedings of, Vol. 10, Nos. 78 and 79, 1867-8.
Ditto ditto, "General Connotations of Magnetism," and "Some Remarks on the Fall of Rain as affected by the Moon," by Pliny Earle Chase.
National Academy of Sciences, Washington, Report of, 1866-67.
Cincinnati Astronomical Society, Annual Address.
Ditto ditto, Oration on laying corner stone of Observatory.
Columbia Institution for Deaf and Dumb, 10th Annual Report of.
Public Schools, Washington, 22nd Annual Report.

The Secretary, after reminding the Fellows that at the last meeting of the Society the subject of the Ramie plant (*Bœhmeria Nivea*), from which the grass cloth of China is manufactured, had been discussed, read the following observations on it by Mr. F. Abbott, the Superintendent of the Gardens :—

"In reference to the China grass, (*Bœhmeria Nivea,*) seeds of which have been forwarded to the Society, through Dr. Milligan, it may be interesting to the Fellows to learn that the plant has already been in the garden 10 or 12 years, but no attempt has yet been made to extend its cultivation.

"It is very doubtful whether the climate of Tasmania will be found suitable for the successful cultivation of this fibre. The plant which is indigenous to China, India, Sumatra, &c., requires a rich porous soil, and warm moist climate ; under these conditions it grows rapidly and affords from two to three cuttings during the season.

"In Queensland, where the plant succeeds well, great difficulty has been experienced in extracting the fibre; this difficulty appears to have been generally experienced, as the English Government, through the Indian Office, are at present offering an award of £5000 for the invention of a machine capable of extracting the fibre, the cost of separation not to exceed £15 per ton, and the value of the separated fibre to be not less than £50 per ton.

"In China where the plant is extensively cultivated, the fibre is separated by hand, but this mode of separation, a tedious one, is only suited to labor of the cheapest description, and could not be adopted in the colonies.

"I have planted a small bed in the gardens with this plant, with the view of proving how far it is adapted for culture in Tasmania.

"F. ABBOTT, JUN.,
"R. S. Gardens.

"12th September, 1870."

A paper, entitled "Notes of an Excursion to Cummings's Head and the Falls of the Meander, on the Western Mountains, Tasmania," by W. Archer, Esq., F.L.S., was then read by the Secretary.

Special votes of thanks having been accorded to Mr. Archer, and to the Smithsonian and other institutions in America, the meeting closed with the usual thanks to donors of presentations.

OCTOBER, 1870.

The monthly evening meeting of the Fellows was held on Tuesday, the 11th October, His Excellency, C. Du Cane, Esq., President, in the chair. The Hon Mrs. Du Cane and Mr. C. M. S. Chichester, Private Secretary, were also present, together with the following members of the Society: —Dr. Agnew, Messrs. M. Allport, J. W. Graves, L. R.Castray, S.Wright. F. Abbott. J. McC. Browne, F. Abbott, junr., H. Bilton, and Colonel Crawford.

The following gentlemen, who had previously been put in nomination, were after a ballot declared duly elected as members of the Society,viz.:— Mr. P. T. Smith, of Syndal, Ross, and Mr. J. Young, of Howrah, Bellerive.

The Hon. Secretary, Dr. Agnew, laid on the table the following returns for the past month:—

1. Visitors to Museum, 685.
2. Ditto to Gardens, 1906.
3. Seeds received at Society's Gardens.

a. From Dr. Milligan—Collection of seeds of ornamental shrubs and trees, flowers and vegetables; from the gardens of the Royal Horticultural Society, London. A packet of seed of the China grass fibre plant (*Bœhmeria nivea*), from the Royal Botanic Society's Gardens, London.

b. From Mrs. Woodin—Seeds of Umbrella Pine of Japan (*Sciodopitys verticillata.*)

4. Time of leafing, &c., of a few standard plants in Society's Gardens.
5. Books and periodicals received.
6. Presentations to Museum.

Meteorological Returns.

1. Hobart Town—From F. Abbott, Esq., table &c., for September.
2. Port Arthur—From J. Boyd, Esq., ditto, ditto.
3. Swansea—From Dr. Story, ditto July and August.
4. Westbury—From C. Belstead, Esq., ditto September.
5. Sydney—From the Government Astronomer, ditto for July.
6. New Zealand—From the Government Observer, tables from various stations for June and July; and from Wellington for August.
7. From Government Astronomer, Melbourne, table for August.

The presentations to the Museum and Library were as follow:—

1. From Mr. Baynton, Brown's River—A small collection of Land Shells, Crustacea, &c.
2. From Mr. W. Johnston, Trinity Hill—A specimen of the Bronze-winged Cuckoo (*Chrysococcyx lucidus*), from Kangaroo Bottom.
3. From Mr. J. W. Graves—A Sparrow Hawk (*Accipter torquatus*).
4. From Mr. F. Butler—Four specimens of ore from Penguin Creek silver mine.
5. From Rev. J. Hutchison, New Town—A Hermit Crab (*Pagurus sp*).
6. From Captain Williams—A Cuttle fish from the East Coast.
7. From Mr. T. Giblin—Specimen of the paper-like bark of a species of Tea-tree (*Melaleuca sp. ?*), from New South Wales.

[The tree from which this bark was obtained is probably identical with, or closely allied to the swamp Tea-tree (*Melaleuca ericæfolia*), of this colony, in reference to which the following note appears in Hooker's "Flora Tasmaniæ," vol. 1, page 129:—"Mr. Gunn describes this as one of the commonest inhabitants of the marshes, often forming an impenetrable scrub, most expensive to clear. Trees of it attain 70 feet, and

4-5 feet in girth; one which that naturalist has measured was unbranched for 27 feet, and was 5½ feet in girth at 3 feet above the ground. In poor sandy soil it forms a dwarf bush. Of the bark, he adds, the natives used to make the catamarans, or canoes, so admirably figured in Labillardiérés voyage, which were stitched with the bark of *Sida pulchella* and *Plagianthus sidoides*."] (Currajong.)

8. From Mr. F. Wise, a Smolt caught with rod and line in the Derwent at New Norfolk.
9. From Dr. J. Milligan, F. L. S., a copy of "The Last of the Tasmanians," and one of "The Daily Life of the Tasmanians," by J. Bonwick, F.R.G.S.

The Secretary read some "Notes on an experiment with the fumes of sulphur, and on other methods for the destruction of rabbits in their burrows," by W. Archer, Esq., F.L.S. The fumes were forced into a burrow by means of bellows, attached to a receptacle in which the sulphur was burned; and that this was effectually done was proved by the escape of sulphurous vapour from the bolt-holes. When the burrow was afterwards opened, however, no trace of the fumes was left, nor were the animals destroyed. The experiment was recorded as a "guide or warning to others who may be induced to try further experiments with the fumes of sulphur, or with any other vapour." (Carbonic acid gas would not become condensed, and it would be fatal to animal life, but its use would probably be much too expensive).

Mr. Abbott read a paper "On the Sun and its Office in the Universe."

Some discussion of a conversational character having taken place,

Mr. M. Allport begged to call the attention of the meeting to the fish presented by Mr. Wise (presentation No. 8), on account of its high scientific importance, as furnishing a complete answer to the theory raised by Dr. Günther in reference to the salmon first sent to England. The Doctor then assumed that the fish sent was hatched from one of the eggs imported from England in 1866. This assumption was met by the statement that the fry unnaturally detained in fresh water had reached a higher state of development than the smolt sent to England, and as the fish now presented was but just assuming the smolt stage, all the arguments used in reference to the smolts first caught apply with tenfold force to this specimen. It was, moreover, fortunate that the Museum possessed one of the fry hatched from the English eggs received per Lincolnshire in 1866, and which died in the spring of 1867. Upon comparing this with the fish now caught, it would be found that they accorded with one another so closely, as to leave little doubt of their identity in species. No report had yet been received from England as to the smolt last sent, though they had heard of its safe arrival. Mr. Allport further observed that Mr. Youl, in writing to Sir Robert Officer, had expressed a wish that the Salmon Commissioners should make it publicly known that after careful examination he entirely concurred with Dr. Günther in the opinion that the specimen first sent to England was a Salmon trout (*Salmo trutta.*)

His Excellency read the following extract from a letter which he had received from F. S. Corrance, Esq., M.P., an experienced salmon fisher in Scotch, Irish, and Norwegian rivers, and who had considerable opportunities of studying the habits of the fish:—"Concerning your salmon experiment doubts will soon cease. For although a few fish would be undiscoverable in deep water, so soon as the spawning season begins they will be evident enough upon the upper fords and shallow waters. The success of the experiment will depend upon the mollusca upon the sea banks, and the absence of formidable enemies outside, more than the capabilities of the rivers themselves. And I take it that the destruction is so great that a constant and copious artificial supply will be requisite for some time to establish the genus unless under most favorable circumstances. Whether they will rise to fly or not, is once more most uncertain. I believe it to depend entirely upon the habits in that respect acquired by the smolts before they leave fresh water. It is at all events a most interesting experiment." His Excellency stated he would, when replying to Mr. Corrance's letter, request him to examine the specimens of our smolts at the Zoological Society's Museum, London.

Mr. M. Allport remarked that Mr. Corrance's statement, that the fish would be readily detected in the spawning season at the upper fords and shallow waters of the Derwent, was undoubtedly correct, but the fact was, it would be quite impossible, with our pecuniary means, effectually to watch the hundreds of miles frontage in the upper waters of the Derwent and its tributaries. These streams run through great tracts of country uninhabited, and in places almost impassable. It was to be recollected, too, that all expense of this kind would be virtually thrown away, as the result of the experiment must necessarily soon be known in the due course of events.

In order to show how unreasonable it was to argue that the salmon experiment had not succeeded, because no large fish had hitherto been caught, Colonel Crawford read the following extract from the "Reports of the Commissioners of Fisheries of the State of Maine, 1867-8," p. 22:—"In the fall of 1850, I put into the Sandy River Ponds ten or twelve trout. For seven or eight years no indications of them were to be seen, notwithstanding thousands of people crossed those ponds every year. Since 1857, it is judged that not less than 2,000 pounds have been taken out annually."

The usual votes of thanks having been accorded to the authors of papers and to the donors of presentations, His Excellency left the chair.

NOVEMBER, 1870.

The monthly meeting of the Society was held on Tuesday, the 8th November, J. Barnard, Esq., in the chair.

Among the Fellows present were Colonel Crawford, Dr. Agnew, Messrs. J. Allport, H. J. Buckland, M. Allport, H. Bilton, F. Abbott, jun., J. Roberts, J. W. Graves, L. Susman, L. R. Castray, C. M. Maxwell, A. G. Webster, Justin McC. Browne. Messrs. Curtayne and McFarlane (2) were also present as visitors.

The Secretary laid before the meeting the following returns for the past month, viz.:—

1. Visitors to Museum, 737.
2. Ditto to Gardens, 2232.
3. Time of leafing, flowering, &c., of a few standard plants in Botanic Gardens.
4. Books and periodicals received.
5. Presentations to Museum and Library.

Meteorological Returns:—

1. Hobart Town, from F. Abbott, Esq., table and summary for October.
2. Swansea, from Dr. Story, ditto for September.
3. Port Arthur, from J. Boyd, Esq., ditto for October.
4. Sydney, from Government Observatory, ditto for August.
5. Melbourne, from ditto, ditto for September.

The following presentations to the Museum and Library were brought under the notice of the meeting:—

1. From Mr. M. Allport.—A Black Snake *(Hoplocephalus curtus)* from near the waterworks reservoir. Length, 4 feet 6 inches. A Fox Shark, or "Thresher" *(Alopias vulpes)* caught in Adventure Bay.
2. From Captain Warren, R.E.—Pair of feet of "Cariboo Deer" of Nova Scotia, a pair of Indian mocassins made from skin of hocks of "Moose Deer" of Nova Scotia. (A note from Captain Warren, which accompanied these specimens, descriptive of the mode of preparing the mocassins, was read.)
3. From Mr. J. Young, Howrah.—A human Skull from Fiji, Jaws of a species of Shark caught in the Derwent. [The fish from which this specimen was obtained is probably identical with the Port Jackson shark (*Cestracion* Cuv.), figured in "Phillips' Voyage to New South Wales," p. 383, and is interesting as being the only known living representative of an extinct species found in the European tertiaries.]
4. From Mr. F. Allison, Sorell.—A pair of Mexican Spurs.
5. From Salmon Commissioners.—A Salmon Trout Smolt, *(Salmo trutta)* from breeding ponds, River Plenty.
6. From Rev. H. D. Atkinson.—Eleven specimens, embracing eight varieties of Echini from Three Hut Point.
7. From Mr. Richard Robertson.—A large bony mass from a horse's jaw which had been previously fractured.
8. From Mr. L. Henn.—Curious growth of Honeysuckle *(Banksia sp.)* sapling.
9. From Mr. W. H. Price, Macquarie Plains.—A Ram's head with four horns.
10. From Mr. T. Herpich, Glenora, Fenton Forest.—An Austrian note, value 1 Gulden (9d. English); two quarters of ditto; five Turkish coins, one ½ Piastre, two ¼ do., two Paras; Austrian three Kreutzers; two Skillings, Hamburg.

11. From Mr. H. M. Hull.—Butterflies from Benalla, Victoria.
12. From Mr. G. Davies.—A chick with four legs.
13. From the Government of Victoria.—Results of Magnetic Survey of Victoria, by Dr. Neumayer, 1 vol., 4to.
14. From Government of United States, per the Smithsonian Institution, Washington, United States Coast Survey for 1863-4 and 5, three vols. 4to, bound.

[The Secretary called attention to the very great value of the presentations so frequently received through the Smithsonian Institution. The books before the meeting were profusely illustrated by valuable maps, and could only have been prepared and published at a very large outlay by the American Government.]

15. From J. Barnard, Esq.—Catalogue of Sydney Intercolonial Exhibition, 1870.
16. From J. Abbott, Esq.—A specimen of Coal with its overlaying shale, from Rookwood, Three Hut Point.

[Accompanying this presentations were several printed and other documents, extending over a period of nine or ten years, in reference to the value of the coal, &c.]

In reply to a query, the Secretary intimated that he had no information as to the thickness of the seam, but he had heard a very favorable opinion given as to the quality of the coal.

Mr. Maxwell suggested that the most practical and satisfactory method of establishing its value would be by having a ton of it sent to the Gas and Steam Companies for the purpose of being tested.

17. From J. J. Butler, Esq., Bagdad.—An English Perch *(Perca fluviatilis)*, aged seven months.

Mr. Allport at the same time exhibited several young perch from a few days to three weeks old, in order to show the enormous rapidity of growth, and consequent value of these fish as an article of food.

The Secretary read a continuation of "Notes on an excursion to Cummings's Head, and the Falls of the Meander," by W. Archer, Esq., F.L.S. Also a paper by the same author, entitled "Notes on the Californian Thistle."

Mr. M. Allport read the following notes on the salmon trout *(Salmo trutta)* at the River Plenty:—"Another, and an important addition has, since our last meeting, been made to the history of the salmon experiment. It will be remembered, that in the winter of 1869, those of the salmon trout *(Salmo trutta)*, which were detained in fresh water, first spawned, and when the eggs hatched, it became a question of great interest, whether the fry would, in due season, exhibit the migratory instincts of their species in the same manner as if the parent fish had spawned after a visit to sea; and this question became of still greater interest from the doubts entertained by scientific men in England, as to whether the fish detained at the Plenty were really salmon trout at all, some going so far as to assert that they could not be genuine because they had spawned, and that no migratory salmon ever would breed without the previous journey to sea. The Salmon Commissioners, some time since, sent to England specimens of the young fish, hatched from the first eggs laid by the salmon trout, such young fish being then seven months old, at which time they exhibited, in a marked degree, all the characteristics of the par of migratory salmon, and especially the orange-coloured fins, which are looked upon as peculiar to the par of the salmon trout. Had the experiment stopped at the time when those young fish were sent away, many people might have jumped to the conclusion that some mistake had occurred, and that these young fish were really, as Dr. Günther suggested, hybrids and not salmon trout; but, fortunately, we have now in the specimen on the table the most convincing proof that these young fish belong to some migratory species of salmon, and we have, therefore, no right to doubt the statement of those who sent the eggs from which the parent fish were produced, and must admit that their progeny are true salmon trout. The specimen before you (presentation No. 5) is a facsimile of some 300 others now in our large pond at the Plenty, all of which have assumed the full smolt dress of brilliant scales, which dress is not only the invariable characteristic of those which migrate seawards, but also the unerring sign that they are ready to depart. Besides the great fact of the final success of the salmon trout, which this specimen abundantly proves, there is another interesting point to which I desire to call attention. Of the two smolts caught in the estuary of the Derwent in the end of October last year (that is at the very same season at which this specimen has been taken from the pond) one was sent to England and pronounced by Dr. Günther to be an abortive salmon trout, the other was kept here, and is now before you. Upon comparing these specimens, you will find that the salmon trout smolt from the pond at the Plenty, though a healthy, well-fed, well-shaped, silvery fish, is not one-fourth of the weight of its abortive brother, and they exhibit other differences which make it difficult to believe that they are identical in species. During the last fortnight the parent salmon trout, unhappily reduced in number to 11, and which first assumed the smolt livery three years ago, have exhibited marked restlessness at their forced detention, swimming round and round their pond, seeking an outlet, and even throwing themselves out of the water at the lower grating in such a determined manner as to render it necessary to increase the height of the guard to prevent their escape."

A list, in course of publication by Mr. Legrand, of 42 new species of Tasmanian land shells, principally discovered by him, was laid on the table for inspection. Accompanying and illustrating the list was a series of lithographs, exquisitely rendered by Mrs. Forde and Miss Scott, of Sydney.

A very beautiful collection of roses, comprising thirty-two named varieties, from the Society's Gardens, was exhibited, and was examined with much interest by the Fellows. Mr. Abbott mentioned that the Gardens now contained about one hundred and fifty varieties of this flower.

After some conversational discussion, the usual vote of thanks having been accorded to the authors of papers and the donors of presentations, the meeting terminated.

NOTES OF AN EXCURSION TO CUMMINGS'S HEAD AND THE FALLS OF THE MEANDER, ON THE WESTERN MOUNTAINS, TASMANIA.

By W. Archer, F.L.S.

Accompanied by a friend and two servants I started on the morning of May 10th, 1848, for an excursion to Cummings's Head, a spur of the Western Mountains near Cheshunt, with the intention of visiting the falls of the Meander River, which I had seen before in the summer, when a mere silvery thread of water was all of them that was visible. We hoped at this season to find a large stream flowing over the dark basaltic rocks of the mountain side. Our provisions consisted of 4℔. of cold meat, 12℔. of bread, 3℔. of rice, 5℔. of sugar, and ¾℔. of tea; and we took with us an opossum-skin rug, a pair of blankets, and a light tent weighing 3¾℔.—besides the usual accompaniments of matches, knives, tomahawk, &c.

At the foot of the mountain we first passed through a gum-tree forest, with a thick underwood of "native hop" or "bitter leaf" *(Daviesia latifolia)*, mixed with the "native indigo plant *(Indigofera tinctoria)*, the "clover tree" *(Goodia lotifolia)*, red and white Epacris *(Epacris impressa)*, "prickly beauty" (*Pultenæa juniperina*), the common "fern" (*Pteris aquilina, var. esculenta)*, and other less conspicuous plants, all destitute of flowers at this season; and then entered a dense thicket composed for the most part of "musk-wood" (*Eurybia argophylla*), "dog-wood" (*Pomaderris apetala*) "daisy-tree" (*Eurybia lirata*), "stink-wood" *(Zieria lanceolata)*, "fern-trees" (*Dicksonia antarctica*), and the common "fern" 6 and 7 feet high—growing beneath gigantic trees of "stringy-bark" (*Eucalyptus robusta*), "white-gum" (*Eucalyptus viminalis*) "blackwood" (*Acacia melanoxylon*), and "silver wattle" (*Acacia dealbata*)—and rendered almost impenetrable by the huge trunks and branches of fallen gum-trees, and a net-work of nettles (*Urtica incisa*), with the rope-stemmed Clematis (*Clematis coriacea*) and Lyonsia (*Lyonsia straminea*), here and there, stinging our hands and faces, or tripping us up as we scrambled and cut our way through the entangled mass of vegetation. To the right of our track were some many-crowned fern-trees (*Dicksonia antarctica*), one with about thirty crowns—a wonder of the vegetable world,—and somewhat further on we came to a white-gum tree of enormous height, towering far above the surrounding forest, and rising to an altitude of some 300 feet, with a trunk about 40 feet in circumference at a height of 4 feet from the ground, tapering very gradually up to the first branches, fully 150 feet from the base.

At the height of 500 feet from the plain—about 1,400 feet above the level of the sea—plants which grow to a height of 30 feet on the low ground are dwarfed down to shrubs. "Native box" (*Bursaria spinosa*), for example, is here a thorny little shrub a foot to 18 inches high,and the small-leaved Coprosma (*Coprosma microphylla*), is reduced from 12 to 2 feet in height. At an elevation of 2,000 feet above the sea, the character of the vegetation is altered considerably, and the gum-trees lose the straightness and slenderness of their branches, and their now spreading tops approach the ground more closely. The "waratah" (*Telopea truncata*), 3 feet high, and "wax-cluster plant" (*Gaultheria hispida*), 2 feet high, grow here among the rocks; and a little higher up the pretty little Tetracarpæa (*T. Tasmanica*) makes its appearance. Huge masses of rock, detached from the crags above, are now met with, and the shrubs and trees have a somewhat battered and straggling form, until the summit is reached, when they are found to assume a dwarfed and more compact appearance.

On reaching the summit, we rested for awhile from our labours, and ate our dinners, water being found in a little hole which I had previously dug beneath a dripping rock. Before starting again, my friend and I clambered to the very apex of Cummings's Head, where there is a little plateau of a few yards square. From this spot, situated at the brink of a terrific precipice, there is a wondrous view of the country lying to the west, north, and east, including the towns of Deloraine and Westbury in the middle distance, and the northern line of coast as far as the eye could reach to the eastward, and for a considerable distance to the westward, until shut out by Mount Roland and other intervening mountains. Wishing to get the bearings of some of the principal mountain peaks, and especially of Quamby Bluff, rising in solitary grandeur on the east, I placed my compass on one of the rocks of the plateau,—when, to my great surprise, the bearing indicated was due west instead of due east; and it turned out that the local attraction was so great that the points of the compass were all reversed as long as the compass remained in direct contact with the rock. On removing it from the rock, and raising it to the height of three feet above it, I found the bearings restored to their true position. This fact shows how careful explorers should be in availing themselves of commanding points for the purpose of fixing the positions of their camps of rest or observation; or the routes to be taken in order to reach other localities. We now descended about 400 feet, to a plain lying between the heads or sources of two rivulets, one flowing to the east and entering the Meander, just above Archer's Sugarloaf, and the other flowing to the north-west into Dale Brook, near Gibson's Sugarloaf.

Upon this plain are found the large "mountain ranunculus" (*Ranunculus Gunnianus*), with its bright, varnished yellow flowers, purple underneath, and much-divided leaves, and the curious little "Caltha" (*C. introloba*) both found also on the Victorian Alps by Dr. Mueller,—a little yellow-flowered "Stackhousia" (*S. pulvinaris*), occurring also on the Gipps Land mountains,—a prostrate little Pultenæa (*P. fascicularis*), gathered also on the Cobberas Mounts in Victoria,—the singular little *Liparophyllum Gunnii*, belonging to the Gentian tribe, found nowhere else in the world, small large-flowered plants of the "mountain gentian" (*Gentiana montana*), found also on the mountains of Victoria, New South Wales, and South Australia,—the little *Mitrasacme Archeri*, found nowhere else,—*Euphrasia alpina*, *striata*, and *cuspidata*, the first found on Mount Kosciusko in New South Wales, and on the Cobberas Mountains in Victoria, a most singular little plant—and the last nowhere but on the Western Mountains, Mount Sorell, and Mount La Perouse in Tasmania; besides several other plants peculiar to mountainous localities, and some that are found also on the plains, such as the common "tea-tree" (*Leptospermum lanigerum*) which grows here in thickets to the height of 12 to 15 feet.

We erected our light tent—made of unbleached linen, and enclosing a space of six feet by six feet and a half—and leaving the servants to procure a large supply of dry fire-wood for consumption during the long and cold night, made our way down the valley of the eastern rivulet. After descending about 200 feet to a spot where the rocky sides of the valley rise steeply from each bank of the stream, we came to fine specimens of different species of the largest kinds of "mountain pine"—as I generally call it,—*Athrotaxis cupressoides*, *selaginoides* and *laxifolia*,—and also the "celery-topped pine" *Phyllocladus rhomboidalis*, which occurs also on the Meander near Cheshunt. Here were also many beautiful and rare mosses, clothing or fringing the rocky margins of the brook; here I found a pretty white violet,—found also in New Zealand,—*Viola Cunninghamii*; here, straggling among the rocks, is *Decaspora disticha*, with its little clusters of purplish berries. Having gazed our fill at the rare and noble trees and curious alpine plants around us, and made a collection of botanical specimens, we returned to our tent.

One side of the tent being left open towards the large fire, we passed a comfortable night, sleeping on a bed of tea-tree branches, with our feet towards the blaze, and only waking when the diminished heat warned some one of us to put on more wood. The coldest part of the night was—to use the words of a well-known song—"2 o'clock in the *morning*," owing partly, I suppose, to the fire having died down at about that hour.

We started very early next morning in a direction nearly due south, in order to skirt a rocky gully, the hidden source of Dale Brook, and then crossed a plain in a south-easterly direction. On our way we passed through a large quantity of the mountain *Bellendena* (*B. montana*), a handsome glaucous-leaved small shrub, with pointed spikes of cream-colored flowers, followed by reddish-brown pods,—an alpine form of that very graceful branched fern, *Gleichenia dicarpa*,—the pretty and rare *Eurybia abcordata*, only found on the Tasmanian mountains, with its wedge-shaped leaves, toothed at the apex, and daisy-like flowers,—the bright "green cushions," bespangled with the disproportionately large berries of the tiny *Pernettya Tasmanica*, a plant of the heath tribe, found only on the mountains of Tasmania,—and the beautiful little *Gaultheria antipoda*, not found anywhere else in Australia, but occurring on lofty mountains of the Middle Island, New Zealand,—the cider-tree (*Eucalyptus Gunnii*),—and many other rare and interesting plants. On the plain just mentioned we found a small group of the cypress-like "mountain pines" (*Athrotaxis cupressoides*), with a ragged and broken-down appearance. Shortly after passing them we began to ascend the western end of the Ironstone Mountain range, and came upon a kind of saddle between the trigonometrical station and "West Bastion Bluff." Here we found that curious little coniferous plant, *Microcachrys tetragona*, lying, here and there, perfectly flat on greenstone rocks, whose surfaces were nearly level with the ground; and then, keeping too much to the left, we passed through or over an underwood of a dwarf pine, about four feet high,—which attains to the height of ten feet in very sheltered situations—called *Diselma Archeri*, with many straggling branches so close to the ground, that if one put one's foot between instead of on them, one's progress became slow and exceedingly laborious. My friend, who did not succeed well in making his way through them, on coming up to me, botanising while waiting for him, requested me particularly to tell him the name of the plant, "in order," as he said, "that he might hate it all his life."

Looking from the top of West Bastion Bluff we saw Lake Lucy Long—a somewhat appropriate name—extending in a lengthened, narrow sheet of water to the westward, on the plain below. Far away to the south-west the Frenchman's Cap stood up against the horizon, and to the southward lay the Lakes Augusta and Ada, and the other waters of the Nineteen Lagoons. Turning to the left after leaving the saddle, and skirting the upper part of Ironstone Mountain, we proceeded nearly in the direction of the Split Rock trigonometrical station, passing over ground covered with *Astelia alpina*, and soon came to a small lake, which proved to be Lake Meander, the chief source.of the Meander River.

Leaving Lake Meander, with its bright and pellucid water, and scrambling down the bed of a rivulet running towards the east, we soon found ourselves at the brink of a vast precipice, over the face of which the water of the rivulet was falling in a long silvery sheet, frayed at the edges into foam and liquid ravellings, and plashing into a nearly circular basin. Before us lay, in grand ruggedness and confusion of huge crags and great bare patches covered with rocks and stones, interspersed with lines and clumps of small trees and straggling shrubs fighting a hard battle of life for bare existence, the immense gorge at the bottom of which the rapid and winding Meander rushes along its sounding course to the plains below. This gorge extends upwards beyond "The Falls" for about a quarter of a mile, and terminates in a short curve where a stream runs under rocks from a pretty, little shallow lake, not far off, which I named "Lake Pediluvium," for a reason which can be as well imagined as described. From the cliff, to the westward of the end of the gorge, The Falls looked like a tiny thread of silver, suspended from the brink of the precipice above, and we could not hear the noise they produced, after our rough scramble down the rocks and through the shrubs at the end of the gorge, until we were within about fifty yards of the pool into which the water tumbled after its gigantic leap.

On viewing The Falls from the front they had the appearance of an unbroken descending line; but, on moving to the right or left, it became evident, at once, that they consisted of two parts separated by the basin which we had seen from the summit of the rocks. When standing close to the foot of the lower fall the effect was very grand, as the broken sheet of bright water, splashing, foaming, hissing, rent into a thousand fragments, then united, fell in a continuous torrent at our feet, just, in a word, as "the water comes down at Lodore."

One of my companions mounted to the summit of the lower fall, close to the basin, which we had seen from above, somewhat of a circular outline, and found it to be about 100 feet across. From thence he let fall a stone, attached to a ball of twine, until it reached the foot of the lower fall. On measuring the length of this line afterwards I found it to be 150 feet. Judging by this ascertained height, the upper fall must have been fully 200 feet high,—making 350 feet in all.

After refreshing ourselves, and dividing our provisions into equal shares, in readiness for such emergencies as being lost, or being the victim of hungry companions, we started on our way homewards.

A little way above the Meander on the left bank, to which we had crossed immediately after leaving "The Falls," a fine specimen of the mountain pine called *Athrotaxis selaginoides* met our view. It was covered with its small cones just ripe, and afforded a rich harvest to one of my companions, who was on the look-out for such treasures. A little higher up the pretty *Pimelea sericea* occurs, a small shrub, with very pale green leaves, smooth above and covered beneath with long, silky hairs, and bearing (in December) rather large heads of flowers. Passing through a grove of small gum-trees, (?) *Eucalyptus coccifera*, and leaving the eastern bluffs of Ironstone Mountain on the left, we had to scramble across a plateau of great rocks, like those near the summit of Mount Wellington, with deep caverns beneath them into which there was much risk of falling, and then found ourselves on a plain sloping gently towards the river on our right, and dotted with small gum-trees and various shrubs. Here we pitched our tent near a bright little rill, many of which flowed across the plain.

Next morning, pursuing our way northwards, we found a large patch of *Coprosma nitida*, a kind of "native currant,"—as it is absurdly called, merely on account of the colour of its fruit,—thickly covered with its shining, crimson berries. It occurs also on the Bau-Bau Mountains of Victoria. On the plateau of the mountain above us may be found another and much smaller species, (*C. pumila*) which is found on the Bau-Bau and Cobberas Mountains of Victoria. Two much larger species,—*C. hirtella* with much larger berries and leaves, and *C. Billardieri* with berries and leaves smaller,—grow on the lower ground, the latter being very common in some localities. The berries of all the species named have a similar and by no means pleasant flavour.

By the side of a murmuring rivulet which we now crossed, were growing some beautiful plants of *Athrotaxis laxifolia* with its graceful pyramidal form, and delicate branches covered with bright yellowish-green leaves, only long and spreading enough to give the branchlets a somewhat serrated appearance, as they waved in the breeze. The *Athrotaxis* previously mentioned

(*A. selaginoides*), with longer and more spreading, prickly leaves, is more prized in England than this species; but I think this is the more elegant of the two. The third species (*A. cupressoides*) is a much more sombre tree, with smaller and blunter leaves closely appressed to the branchlets. All the species are, I believe, peculiar to Tasmania.

Among the many shrubs through which we now walked and, sometimes, struggled, may be mentioned *Persoonia Gunnii*, with its olive-shaped leaves and black sloe-like fruit,—*Orites revoluta*, *Decaspora thymifolia*, *Tetracarpæa Tasmanica*, *Eurybia pinifolia*, with its pungent leaves,—*Ozothamnus Hookeri*, and *Bæckia Gunniana*. Above us, at a height of about 400 feet, was the summit of the mountain, to which we clambered by a sinuous course over the loose stones, taking care not to move until we were all proceeding in the same direction, in order to avoid rolling down the stones on each other. Arrived at the tolerably level ground above, covered here and there with flat rocks, or with great stones among the smaller shrubs and grass, we could see Cummings's Head to the northward, while the Ironstone Range, with its trigonometrical station and its "Bastion Bluffs," lay to the south-west, behind our left shoulder.

"The cider-tree" (*Eucalyptus Gunnii*) was plentiful on the stony rises, and various alpine shrubs grew beneath its shade, or on the open ground. *Sprengelia montana* and *Cystanthe sprengelioides*,—both of the *Epacris* tribe, the latter closely resembling *Sprengelia incarnata*, but with the peculiar calyptrate flowers of the genus *Cystanthe*,—are found here. Here are the "green cushions," already mentioned, so well-known to mountain excursionists, at first sight appearing to be composed of one plant only, but proving, on examination, to combine four or five; for instance, *Scleroleima Forsteroides* and *Pterygopappus Lawrencii*, both plants of the Composite Tribe,—*Coprosma pumila*, of the Madder Tribe,—*Pernettya Tasmanica*, of the Heath Tribe, and *Oreobolus Pumilio*, a cyperaceous plant, are all found densely packed together in a green, rounded mass, dotted here and there with the drupes of the *Coprosma*, and the berries of the *Pernettya*, or powdered lightly with the tiny flowers of the various plants composing it. The little *Rubus Gunnianus*, of the Rose Tribe, with cream-coloured, bramble-like flowers, followed by blackberry-like fruit of good flavour, occurs in dry sandy spots; the common burr (*Acæna Sanguisorbæ*), of the same tribe, exhibits its patches of pretty green, wrinkled leaves, smaller and more wrinkled than those of the variety on the low ground; *Eurybia persoonioides* and *E. alpina* of the Composite or Daisy-flowered Tribe,—thrown together into one species by Bentham, but differing in some important particulars,—are seen, often close together, with their leaves, dark green and glossy above, and covered with densely-packed hairs beneath,—the flower-heads (daisy-like flowers so-called) of the former being several together on long slender stalks, while the latter bears single, larger heads of flowers, on short, stout stalks; *Boronia rhomboidea* and *B. pilosa*, with their pretty, pinkish, four-petalled flowers, and leaves smelling like Rue; the little Mountain Sundew (*Drosera Arcturi*), found also in Australia, New Zealand, Europe, Africa, &c., with its largish, white flower,—and the tiny *Claytonia australasica*, of the Purslane Tribe, found also in New Zealand and America,—*Nertera depressa*, a very small plant of the Madder Tribe, found in Victoria on the Bau-Bau Mountains, and on the banks of the Snowy River,—*Liparophyllum Gunnii*, a little plant of the Gentian Tribe, which occurs in Europe, &c.,—*Ourisia integrifolia*, of the Foxglove Tribe, a small plant, found likewise in New Zealand,—the little Bladder-wort (*Utricularia lateriflora*), —and some other small plants are to be found in wet places; *Cryptandra alpina*, of the Buckthorn Tribe,—the curious little *Stackhousia pulvinaris*, with its stamens, abnormally, of nearly equal height,—the handsome great mountain Daisy (*Celmisia longifolia*), the large mountain Bachelor's Button (*Craspedia monocephala*),—a variety of *C. Richea*, found also in south-eastern Australia,—*Craspedia alpina*, found on Mount Buller in Victoria, —*Raoulia catipes*, of the Daisy-flowered Tribe, in whitish tufts, —the mountain *Gnaphalium* (*G. collinum*, variety *monocephalune*,)—the minute *Mitrasacme Archeri*, the singular little *Pimelea pygmæa*, the remarkable little Rib-grass (*Plantago Archeri*,) with its minute flowers and its leaves closely appressed to the ground, and hairy on both surfaces,—all these occur, here and there, with numerous other plants, over the area between Cummings's Head and Ironstone Mountain. There is also the extraordinary little Eyebright (*Euphrasia cuspidata*), together with two other herbs of the same genus (*C. alpina* and *C. striata*)—to be found on the little plain below the summit of Cummings's Hd. to the southward. We noticed also, between and among the rocky rises farther back, plants of *Diselma Archeri*, and *Microcachrys tetragona*, together with *Podocarpus alpina*,—all belonging to the *Coniferous* or Pine Tribe.

We returned to the summit of Cummings's Head, passing through a wood of dwarfed Beeches, called Myrtle Trees, (*Fagus Cunninghamii*), a little after noon; and having eat n our dinner and refreshed ourselves with bush-tea, and enjoyed again the extensive view over the low country lying to the westward, northward, and eastward, we descended the mountain, and thus terminated a pleasant and most interesting excursion.

THE SUN AND ITS OFFICE IN THE UNIVERSE.

Read at a meeting of the Royal Society, Tasmania.

By F. Abbott, F.R.A.S., &c.

The sun, to us, is not only the largest apparent star in the universe, but also the most brilliant, and that which exercises over the earth the most dominant influences. It is from him that all the energies developed on the surface of the earth incessantly flow, and are continually and successfully carried on by the two hundred and thirty millionth part of the force radiated, which is all the earth is able to receive of the sun's rays. From him also, at epochs immensely distant from us, the planets have been thrown out successively, at first in the form of nebulous rings—agglomerations of matter which have in the end become condensed, and now form the planets of our system.

Compared with the mass of the earth, the mass of the sun is only about 355,000 times as great although its volume is 1,400,000 times larger, which indicates a less density. The matter of which the sun is composed is found to weigh but little more, volume for volume, than a quarter of that of which our own globe is formed. To express the weight of the sun in tons, by figures, would be useless—the number ranks among those which express nothing to the mind.

The light and heat received by our earth from the sun being taken as unity, the planet Mercury would be 6.673, and the planet Neptune, 0.001. Mercury is, therefore, lighted and heated nearly seven times as much as the earth; and the light and heat of the sun have an intensity 6673 times greater on the planet Mercury than at the surface of Neptune, where the apparent diameter of the solar disc is only 1min. 4sec. To compare and know correctly the calorific and luminous intensity of the sun at the surface of the different planets of our system, we must be acquainted with the nature of their atmospheres, and in what proportion the waves of light and heat are absorbed, in passing through those gaseous envelopes. Mercury, for instance, may have an atmosphere so dense that the soil does not receive more of the sun's influence than the soil of the earth.

It was in August, 1612, that Galileo wrote, in the second of his three celebrated letters, concerning the spots on the sun. " For the time to come," he says, " there will remain to physicists a field for speculations about the substance and manner of production of such vast masses as are the solar-spots, concerning which problem I would not venture to affirm anything." It is now more than two centuries and a half since Galileo discovered the solar-spots, and astronomers and physicists have speculated, and still speculate much to explain the phenomenon.

If the body of the sun be observed with a powerful telescope, the eye being properly protected, the enlarged image of the disc will usually appear more or less sprinkled with sun-spots —moveable belongings to the surface of the sun—which spots greatly help the study of the physical constitution of our luminary. The number of these spots follows a certain periodicity, which helps to establish a most interesting correlation between sun-spots and terrestrial magnetism.

When the sun-spots are observed with care during several consecutive days, they are found to vary both in form and position, amidst which variations there is one common and progressive movement in the same direction, from which has been deduced the rotation of the solar globe round an axis passing through its centre. This movement takes place from west to east, and fourteen days is the time during which a spot remains visible, and fourteen days is also the period which elapses between the diasppearance of a spot at the western border, and its re-appearance on the eastern. A point situated on the solar equator travels with a velocity of 4,560 miles an hour, or about 1¼ miles per second.

Sun-spots consist generally of one or more dark portions called *umbræ*, which appear black in comparison with the luminous parts of the sun's disc; around this dark portion is a grey tint, furrowed with dark striæ, this forms the penumbra. The spots are frequently composed of several umbra, inclosed in one penumbra, and sometimes the penumbra is not provided with umbræ. The penumbra frequently reproduces the principal contours of the umbra, and often presents a great variety of shades when examined with high powers.

The dimensions of the spots are variable, and are sometimes enormous; Schroter measured one which he found equivalent to sixteen times the surface embraced by a great circle of the earth, equal to four times the entire superficies of our globe, or more than 29,000 miles. Sir William Herschel, in 1779, measured a spot consisting of two parts, the diameter of which was not less than 50,000 miles. In August, 1839, Capt. Davies measured a sun-spot 186,000 miles in its greatest length.

According to Sir W. Herschel the surface of the sun is made up of "corrugations." Mr. Nasmyth describes the surface as having the appearance of "willow-leaves." Mr. Daws asserts that these interstices differ greatly in form and size—sometimes resembling an ill-shaped arrow-head, at others an irregular trapezium with rounded corners, and that they vary so much in these particulars as to defy every attempt to describe them.

To try and explain the phenomena, in such a manner that they can be connected with the sun's physical constitution, has been the employment of astronomers since the time of Alexander Wilson in 1774, and the results arrived at are such as to satisfy nearly all the conditions required :—

1st. There is a dark central mass.

2nd. There is a luminous stratum, or photosphere, enclosing the former.

3rd. There is a vaporous envelope in which the two are enshrouded, and which constitutes the real atmosphere of the sun.

4th. Is an outer chromosphere, lying on the surface of the luminous photosphere, enshrouding the whole, and through which the solar-spots, of various magnitudes, can all be seen during their formation.

Solar-spots are cavities, or openings of enormous size in the photosphere, and are caused by a down-rush or in-rush of outer vapour into the photosphere—or general plane of condensation for gaseous matter in the sun—which forms a cavity from 20,000 to 40,000 miles deep. On the 29th of August last I counted 42 of these spots, in three groups, on the surface of the sun while taking a transit, and about the same period there were brilliant displays of Aurora on three consecutive nights. On the 21st September I counted upwards of 70 sun-spots, the whole of which were immersed in the penumbra, and on the same evening appeared a strong Aurora. Sun-spots are now at a maximum, and Aurora displays frequent.

On the 26th of September, in company with Mr. Roblin, I counted 43 sun-spots and penumbra, and there were auroral displays on the 23rd, 24th, and 25th ; the 26th was cloudy.

The truth of Galileo's opinion that the solar-spots have some relation to the planets has been verified, first by Schwabe of Dessau, and after by Lamont at Monaco, who individually found that the maximum and minimum of solar-spots, and of the variation of the magnetic needle had each a period of about ten years.

Contemporaneously with Lamont, General Sabine—who together with Hanstein investigated terrestrial magnetism—from observations made at two opposite parts of the globe (Toronto and Hobart Town), accomplished for the perturbation of the magnetic declination, what Lamont had done for the variations was intensity, and proved that a like period of about ten years was found for both inclination and intensity.

This period, observed in all the magnetic elements, precisely corresponded with that discovered by Schwabe for the number of solar-spots.

This isochronous periodicity has been further proved by M. Gautier, of Geneva, and M. Wolfs, of Zurich, each unacquainted with the other's researches, and ignorant of the observations of Sabine, Hanstein, &c.

Since these discoveries have been made, other relations of a different kind have been found to exist between the solar-spots and the position of other planets in the system; not only the number or magnitude of the spots, but their position also is in part dependent on the places of the planets in space. The belief that the earth is a great magnet is of very ancient date, and the same power may be conceded to the other planets as being governed by the same laws. This was the opinion of Euler, Tobias Mayer, and Hanstein; next came Gaus, whose system of terrestrial magnetism was what Newton's theory was to the solar system, as the law of magnetic force varies in inverse ratio of the square of the distance—just as is the case with universal attraction. The result of M. Gaus' investigations was a close agreement between theory and experiment.

There is, however, another phenomenon recognised in the Aurora, which is found to be produced by electro-magnetism, and is connected with the spots on the sun, their maxima and minima corresponding in every case.

It will be remembered by many members of the Society that on the 14th March, 1860, I had the honour to read, in connection with Colonel Broughton, R.E., a paper on "Atmospheric Electricity." At that time solar-spots were at a maximum, and there were some very beautiful displays of Aurora Australis. In the paper referred to I ventured on the following theory, viz., that the rapid rotation of the earth on its axis engendered a large amount of terrestrial magnetism at the poles, which becoming connected with atmospheric electricity, produced the beautiful corruscations which were then seen. My observations were sent home by Dr. Milligan, and forwarded to Professor Loomis, whose investigation of these and other records of the same nature enabled him to trace a period of about ten years for the maximum of sun-spots, of terrestrial magnetism, and of auroral displays.

Soon after that paper reached London I received a complimentary letter from a scientific meteorologist, who agreed with everything it contained except the theory of the production of the Aurora. Since that time, however, and only lately (December, 1869), Mr. Balfour Stewart, Director of Kew Observatory, read a paper before the Royal Astronomical

Society, on the auroral displays, between which and terrestrial magnetism he traced a connection.

This, as a theory, however, has been known since the time of Halley, who suggested that the phenomenon might be due to the passage of magnetism, from one magnetic pole to the other.

Although electro-magnetic power is so strongly developed in the universe, science has not as yet discovered the office it holds, or the part it plays in the movements so well known to be influenced by it. The dynamical theory, according to Faraday and Professor William Thompson, rests on no physical hypothesis whatever, but on the fact that *forces* emanate from the poles of magnets in certain directions, which are called *lines of force*, and occupy a magnetic field. If any body is plunged within this magnetic field, it disturbs or modifies these lines of force according to its nature. If magnetic it concentrates the lines, or draws them towards itself; if diamagnetic it causes them to diverge—thus originating attractive movements for magnetic bodies, and repulsive ones for those that are diamagnetic.

These two forces when applied to the sun, in the same way that we apply the term "gravity," are each capable of producing the same necessary consequences, both varying according to the inverse square of the distance, a property belonging to the law of nature, and which law is capable of being expressed by other terms better known to possess forces than the one in present use. The law of universal gravitation has this inestimable advantage—it may be reduced to calculation, and by a comparison of the results with observation, gives a certain method of verifying the existence of some such force.

To use the words of Laplace, and follow this motion from the departure of a planet on its perihelion passage, "the velocity is then at its maximum, and its tendency to recede from the sun surpassing its gravity towards it, the planet's radius vector augments and forms an obtuse angle with the direction of its motion. The force of gravity towards the sun, decomposed according to this direction, continually diminishes the velocity of the planet till it arrives at its aphelion. At this point its velocity is at a minimum, and its tendency to recede from the sun being less than its gravity towards it, the planet will approach it, describing the second part of its ellipse. In this part the gravity towards the sun increases its velocity in the same manner as it before decreased it, and the planet will arrive at its perihelion again with its primitive velocity and re-commence a new revolution as before. It is highly probable that this law extends from one planet to another, and to every distance from the sun."

To my mind this explanation of a planet's revolution round the sun requires the knowledge to be conveyed by some better term, without relying on the prestige of a name. From the various results obtained by analysis of the solar spectrum may be found the different forces produced by electro-magnetism, so abundantly provided for in the immense magnitude of, and power derived from, the sun.

Of late years a much closer relationship between the sun and the earth than was formerly supposed, has been proved by means of the Spectroscope; and we may consider that there is a still closer analogy between our own and other planets, so that as electric currents exist on the surface of the earth, similar currents exist on the surface of the other planets and of the sun. Venus, when in a crescent form, often appears to be covered with a phosphorescent light in the dark part, which indicates the presence of Auroras at the poles of that planet.

The sun is known to have a mean density equal to that of water, but not everywhere homogeneous or uniformly distributed. The radiation, therefore, to which the sun is subjected must greatly disturb the distribution of caloric, and develope a large amount of electricity, which is a perennial source of heat and light. "This heating force," says Professor Donatti, "which the sun produces through infinite space, when it comes to be confined in the bowels of the earth, is changed into that force which the magnet obeys; in this manner all motions are produced, whence arises heat, then electricity, magnetism, and light, which when combined form universal attraction, and eventually gravitation."

In solar chemistry, it is concluded with certainty, that in the sun's atmosphere, at a distance from us of 91,328,600 miles, the burning heat is produced by substances, the following of which have been found, viz.,—calcium, barium, magnesium, iron, chromium, nickel, copper, zinc, strontium, cadmium, cobalt, manganese, aluminium, titanium, and hydrogen. The lines of all these substances have their dark representatives in the sunlight, and are so characteristic and distinct as to leave no doubt of their presence. Many metals still remain undiscovered in the spectrum of the sun. There is exhibited in London a chromo-lithograph, which contains five hundred of Fraunhofer's dark solar lines, which, in all probability, have a representative in both the stellar and solar spectrum. In the former, especially in southern climes, where the atmosphere is clear, the stars are not all white; here and there may be seen, in beauteous contrast, richly coloured gems, red, orange, yellow, blue, green, purple, &c.; many of which are double stars exhibiting beautiful phenomena of complementary colours—yellow and purple, pale green and blue, orange and sea-green, yellow and sapphire blue, &c., &c. Coloured stars are also seen, with a good telescope, in small clusters invisible to the naked eye, such as ξ Crux, the area occupied by this object is about one-forty-eighth part of a square degree, and when viewed through an instrument of sufficient aperture, the object is extremely beautiful, giving the effect of a rich piece of fancy jewellery. Another such cluster in the same neighbourhood, about half a degree from η Argus, the constituent stars of which are equally brilliant and beautiful, is entered in the Cape observations as a neat cluster, but the colours are not named. These stars, either single, double, or in groups, are amongst the most beautiful objects to be seen with the telescope in either hemisphere, and when we consider that the colours of these stars are all produced by the same substances which we are so familiar with in the earth, we are taught that our knowledge of the universe does not depend only on the power of large telescopes, but that the human intellect may become familiar with things which the human eye cannot see.

It is known from various reasons that the stars are all suns, more or less chemically composed like our own sun; many of them are variable, some are known to have disappeared, and have not been seen since. Others, which before were invisible, have appeared, and remained visible since. About two years ago, there appeared a star of the ninth magnitude in the Northern Crown that all at once put on an unusual degree of brightness, and shone equal to a star of the second magnitude. The light of this star was examined by spectrum analysis, from which it was found to have been suddenly enveloped by flames of burning hydrogen. When the hydrogen was all consumed, the photosphere became less luminous, and the star returned to its former state.

The question which concerns us is, whether our sun is likely to undergo such a sudden change. The most recent observations show us that masses of hydrogen gas, in combustion, rise from the sun's photosphere many thousand miles in vertical height, and constitute the red prominences seen in total eclipses. If such should be the case with our sun—which the prolonged stability of our system does not justify us in believing —two opposite effects might naturally ensue. Either the cause which produces the gaseous evolution may gradually diminish so as to lessen the heat radiation; or this cause may augment and increase the power of the central fire: but in either case it is not certain that life would become extinct, although the altered conditions might gradually give rise to a new Fauna and Flora. We may then console ourselves without indulging in such flights of imagination as those so fitly pourtrayed by Lord Byron in his poem "Darkness":—

> "I had a dream, which was not all a dream.
> The bright sun was extinguished, and the stars
> Did wander darkling in eternal space,
> Rayless and pathless, and the icy earth
> Swung blind and blackening in the moonless air.
> Morn came and went—and came, and brought no day."

In concluding this brief paper I will mention a subject with which the Society is acquainted. Mr. Le Sueur, who had charge of the large Melbourne telescope, in his report to the Royal Society, London,—and contained in the President's address—makes the following statement relative to the star and Nebula η Argus:—"The Nebula around η Argus," says Mr. Le Sueur, "has changed largely in shape since Sir J. Herschel observed it; I believe the Nebula lies nearer to us than the fixed stars seen in the same field." Mr. Le Sueur also states his belief that the star η shines with the light of burning hydrogen, and thinks that the star has consumed the nebulous matter near it.

Without endorsing this opinion of Mr. Le Sueur, it is something to know that the fluctuations in the star η and its Nebula have another authority, notwithstanding there is pending a correspondence on several questions set forth on the altered features of η Argus with a view to obtain a solution, and a closer agreement between the drawings made at Hobart Town, and those made at the Cape of Good Hope, and in India; which, under the circumstances I believe to be impossible, as no two very dissimilar instruments will show nebulous matter alike—to detect small fluctuations will require patient watching over a length of time, with one and the same instrument (a standard) similar to the 18-inch reflector used at the Cape of Good Hope by Sir J. Herschel.

NOTES ON "THE CALIFORNIAN THISTLE."

By W. Archer, F.L.S.

The genus *Carduus*, as established by Linnæus, consists of what are called "True Thistles," with a hairy pappus or calyx; "Plume Thistles," with a feathery pappus or calyx.

Bentham, in his "Hand-book of the British Flora," follows Linnæus; but some botanists class the "True thistles" under the genus '*Carduus*,' and the "Plume thistles" under the genus *Cnicus* or *Cirsium*.

The "Milk Thistle" *(Carduus Marianus)* represents the "true thistles" in Tasmania, and the *Carduus lanceolatus*, or "Spear Thistle" *(Cnicus lanceolatus*, of "The British Flora," by Hooker and Arnott), the Plume Thistles. The "Spear Thistle" of England is what is called in Tasmania "The Scotch Thistle;" but it is not by any means peculiar to Scotland. (The Scotch heraldic thistle is the *Onopordon acanthium*, which is a native of central Europe and of Asia, but certainly not a native of Scotland, according to Bentham.) The "Spear Thistle" *(Carduus* or *Cnicus lanceolatus)* has a biennial root-stock, which sends up for two years, (after which it dies), annual stems, winged and prickly, with broadish, pinnatifid, prickly-lobed leaves, and large, egg-shaped flower-heads, enveloped in involucral, spreading bracts, with stiff, largish prickles. The "Creeping Thistle" *(Carduus* or *Cnicus arvensis)* has a perennial and creeping root-stock, which sends up, perpetually, annual stems, with rather narrow, pinnatifid, very prickly-lobed leaves, and diœcious flower-heads (*i.e.*, the males on one plant and the females on another),—the male flower-heads nearly globular, and the female flower-heads egg-shaped, enveloped in involucral, appressed bracts, with small prickles.

Both the Spear Thistle and the Creeping Thistle are found abundantly in Europe and Asia. The Spear Thistle is, of course, the more easily destroyed of the two. The Creeping Thistle seems to be quite ineradicable.

The Creeping Thistle is mentioned by Professor Johnston as being called in the United States of America the "Canadian Thistle,"—probably because it travelled thither from Canada; and so, I suppose, the same thistle is called here the "Californian Thistle" because it has come to us from California. It is nevertheless the "Creeping Thistle" of Great Britain,—and it never quits a country into which it has been introduced.

METEOROLOGY FOR JANUARY, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·032	29·999	71	50	115·0	46·5	NW SE SW	1·04	
2	29·971	29·829	70	51	117·0	48·5	NW SE	1·30	
3	29·657	29·320	86	58	122·5	56·0	NW E NW	1·04	
4	29·570	29·460	83	50	108·0	47·5	SW	8·33	1·71
5	29·665	29·650	70	51	116·0	51·0	NW	1·04	
6	29·657	29·617	69	54	113·0	51·0	SW W NW	3·12	
7	29·837	29·710	67	47	107·5	44·5	NW SW	3·64	
8	29·433	29·317	68	48	110·0	46·5	NE W	10·41	
9	29·665	29·583	66	48	103·0	47·0	NW W SE	1·56	0·06
10	29·684	29·504	76	49	106·0	43·5	NW SE NW	1·30	0·02
11	29·769	29·617	73	55	116·0	52·0	NW SE W	1·04	
12	29·671	29·464	99	55	75·5	54·0	NW SE	·26	0·29
13	29·540	29·483	62	51	67·0	49·0	S SE	·52	1·53
14	29·954	29·842	64	48	108·0	46·0	SE SW	1·30	0·14
15	30·094	30·070	63	48	110·0	45·0	SW SE	1·04	
16	30·107	29·935	68	46	108·5	43·0	NE SE	1·30	
17	29·826	29·795	69	55	114·0	52·5	SE	1·04	
18	29·535	29·240	82	58	122·0	55·0	NW	26·56	
19	29·765	29·575	78	53	106·0	47·0	NW SW NW	7·80	
20	29·977	29·800	69	55	112·5	50·0	NW SW W	1·04	
21	30·090	30·049	76	45	112·0	42·5	NW SE	1·30	
22	30·076	29·891	77	53	120·0	49·0	NW SE	1·04	
23	29·810	29·683	99	58	138·0	54·5	NW W	1·04	
24	29·852	29·817	78	61	99·0	59·5	SE	1·04	
25	29·663	29·604	69	60	90·0	59·0	E SE	·52	0·74
26	29·874	29·684	67	49	109·5	46·5	S W SW	1·04	0·05
27	29·842	29·715	66	46	101·0	44·0	NW	·78	
28	29·870	29·736	67	54	95·0	49·0	SW SE	·78	
29	29·926	29·779	78	54	119·5	51·5	NW W	5·99	0·03
30	29·879	29·871	75	53	86·0	46·0	NW	3·38	
31	30·101	30·091	66	46	108·0	44·5	NW SE	1·04	
Monthly mean	29·758		62	62	107·60	49·08	Total Force ..	92·63	4·57

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

1st.—First apricot (royal) gathered.
8th.—Grevilea robusta in full flower.
9th.—Jargonelle pear ripe.
12th.—Mulberries commencing to ripen.
14th.—Veronica angustifolia in full flower.

Barometer mean, 29·758 in., being 0·031 in. above the average.
Temperature mean, 62·62°, being 0·22° below the ditto.
Solar intensity mean, 107·60°, being 2·04° below the ditto.
Dew point mean, 49·0°, being 1·55° below the ditto.
Humidity of air mean, ·64, being ·03 per cent. below the ditto.
Elastic force of vapour mean, ·361, being ·012 per cent. below the ditto.
Total amount of rain, 4·57in., being 3·21in. above the ditto.
Increase of spontaneous evaporation on rain fall, 0·23in.
Mean amount of ozone, 5·85, being 1·02 of chromatic scale below ditto.
Electricity active on the 1st, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 14th, 17th, 19th, 20th, 21st, and 29th.

Hot wind on the 3rd, followed by thunder, lightning, and rain. Hot wind on the 18th.

FRANCIS ABBOTT.

METEOROLOGY FOR FEBRUARY, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self - Registering Thermometers.				Wind.		
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	Rain in Inches.
	In.	In.	°	°	°	°			
1	30·121	29·936	82	55	121·0	54·5	NW SW SE	·78	
2	20·849	29·807	77	59	118·0	58·0	NW SE	6·25	
3	29·830	29·752	73	60	112·0	59·0	E SE E	1·04	
4	30·239	30·213	68	46	106·0	43·5	SW SE	1·04	
5	30·197	29·909	82	49	116·0	47·0	NW NE SE	1·04	
6	29·941	29·865	74	50	61·1	55·0	SE	2·82	0·03
7	30·178	30·158	65	43	105·0	40·5	NW SE	1·04	
8	30·142	30·057	70	47	110·0	45·0	NW SE	1·30	
9	30·076	30·063	65	54	89·0	50·5	NW SE	·78	
10	30·063	29·955	63	55	72·0	54·0	NW NE NW	·78	
11	29·706	29·421	82	54	120·0	52·5	NW W	10·68	
12	29·726	29·697	72	54	103·5	53·0	NW	5·72	
13	29·821	29·805	75	58	110·0	55·5	NW	1·30	
14	30·032	29·924	77	47	110·0	45·5	NW SE	1·04	
15	29·768	29·570	89	52	129·0	51·5	NW SE	1·30	
16	29·902	29·763	81	54	111·0	53·5	SE SW SE	·52	
17	29·975	29·883	68	43	108·5	39·0	NW SE	1·30	
18	29·684	29·548	81	49	114·0	47·5	NW E	1·56	
19	29·772	29·617	74	56	115·0	54·0	NW W	6·25	
20	29·917	29·821	76	52	113·0	49·0	NW SE	1·30	
21	29·879	29·520	92	54	130·5	48·0	NW	·52	
22	29·735	29·606	87	57	91·0	57·5	NW	1·30	
23	29·735	29·606	69	49	113·0	47·5	N SW NW	1·04	0·01
24	30·092	29·874	76	45	110·0	42·0	NW SE	1·30	
25	29·824	29·771	71	52	108·5	48·0	SW NW	·78	0·03
26	30·233	30·045	59	43	95·0	41·0	W SW	5·06	0·24
27	30·500	30·438	60	45	103·0	42·0	SE	1·30	0·04
28	30·455	30·361	69	42	106·0	39·0	NW SE	1·36	
Monthly mean	29·928		63	45	107·36	45·46	Total Force ..	60·88	0·35

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

1st—Kerry pippin apple commencing to ripen.
2nd—Windsor pear ditto ditto.
4th—Bon chretien pear ditto ditto.
6th—Greengage plum ditto ditto.
15th—Common ash commencing to shed seed.
18th—Common Sycamore ditto ditto.

Barometer mean, 29·928 in., being 0·097 in. above the average.
Temperature mean, 63·45°, being 1·57° above the ditto.
Solar intensity mean, 107·36°, being 0·51° below the ditto.
Dew point mean, 48·2°, being 2·35° below the ditto.
Humidity of air mean, ·62, being ·08 per cent. below the ditto.
Elastic force of vapour mean, ·355, being ·019 per cent. below the ditto.
Total amount of rain, 0·35in., being 1·34in. above the ditto.
Increase of spontaneous evaporation on rain fall, 4·97in.
Mean amount of ozone, 6·37, being 0·64 of chromatic scale below ditto.
Electricity active on the 4th, 8th, 11th, 12th, 13th, 14th, 16th, 17th, 18th, 20th, 21st, 23rd, 25th, and 28th.

Strong Aurora Australis with frequent erratic meteors on the 1st. Wind strong from N.W. and S.E. during the month.

FRANCIS ABBOTT.

REMARKS ON OBSERVATORY RECORDS, WITH HEALTH REPORT FOR JANUARY AND FEBRUARY, 1870, AND A COMPARISON OF THE VITAL STATISTICS OF 1869, WITH THOSE OF PREVIOUS YEARS. BY DR. E. SWARBRECK HALL.

The only striking variations from the usual January weather to be seen in the table are—First, the deficiency of ozone, the amount being much below the January average, and less than for any of the previous twelve years recorded; second: Windforce was much above the average with a great predominance from that point of the compass, N.W., most adverse to health; third: though the temperature mean was not in excess, the extreme range in the month was greatly so; fourth: Rainfall was most advantageously above the average, only one January in the twenty-nine years recorded having a greater fall, *i.e.*, 1849, with the small superiority of four-hundreths of an inch. On the other hand humidity mean was considerably below the average. The electrical condition of the atmosphere recorded shows nothing inimical to health, the positive indications as well as the tension, being an usually fair proportion of the whole. The Hobarton district deaths this month, so far recorded, 64, are 15 above the average of the previous 13 years, 23 more than 1869 had, and considerably higher than any year since 1860, when 72 deaths occurred. 1858, the highest of the 13, having had the maximum 74, and 1864 the minimum 24. This excessive mortality was not owing to the prevalence of any epidemic disease, and it fell heaviest on adults and very aged persons. Of the 64 deaths, 19 only were under one year old, while 1860 had 28, and 1858 had 32. From 1 to 5 years old the present January had only 3 deaths, while 1860 had 7, but 1858 had 10. From 5 to 20 years old the deaths were 3, while 1860 had 7, but 1858 3 only also. From 20 and all ages above the deaths were 38, while 1860 had only 30, and 1858 only 29. Above 60 years old January, 1870, had 17 deaths, 1860 only 9, 1858 only 8. December, 1869, however, had 6 deaths less than the December average, while December, 1859, had 17 more than the average, and December, 1857, 3 more.

The Hobarton Registration District had the smallest number of deaths, for the whole year of 1869, than any of the previous twelve, the number being only 472, while the average of the previous 12 is 568, and the least in the number, 492 in 1865. This is without reference to the increase annually of the population by excess of births over deaths. For the whole of Tasmania, too, the registered deaths, 1335, were the fewest in proportion to population, being 129 less than 1868 had, and 107 less than the average of the previous twelve years. 1869 was entirely free from epidemic diseases. Estimating the population of all Tasmania at 100,000, the death rate would be about 13½ per 1000 per annum. The death rate of England and Wales is about 22 per 1000, and the Registrar-General of England considers 17 per 1000 a nominal death rate. So favourable a condition of health cannot be expected to continue long in Tasmania, seeing how wide-spread is the neglect of vaccination and other hygienic measures, which most civilised communities elsewhere are so energetically enforcing. The homely adage, "a stitch in time may save nine," is particularly applicable to Tasmania.

The deaths in February, registered up to the 6th March inclusive, were 48, being 6 6-13ths below the February average of the previous thirteen years.

METEOROLOGY FOR MARCH, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·394	30·195	76	45	116·0	41·5	NW SE	1·28	
2	30·026	29·897	79	52	120·0	49·0	NW SE	1·28	
3	29·829	29·775	79	50	117·0	47·0	NW SE	1·28	
4	29·868	29·787	73	56	110·0	55·5	NW	1·60	
5	30·124	29·982	69	49	106·0	44·0	SW	5·72	
6	29·992	29·863	65	48	106·0	41·5	W NW	8·33	
7	30·245	30·160	66	46	105·0	44·0	NW SW SE	1·04	
8	30·380	30·344	67	40	106·0	37·0	NW SE	1·04	
9	30·317	30·184	67	43	102·0	40·0	NW SE	1·04	
10	30·184	30·124	64	56	71·5	55·5	SW SE	·78	
11	30·437	30·181	61	51	81·0	48·5	SW SE	·52	0·07
12	30·335	30·308	60	52	70·0	51·0	NW E	·52	
13	30·363	30·311	65	51	104·0	49·5	NW SE	1·04	0·04
14	30·344	30·259	73	47	115·0	44·5	NE SE	1·30	
15	30·239	30·185	72	46	112·5	41·5	NW SE	1·04	
16	30·225	30·198	72	54	108·5	50·5	NW SE	·78	
17	30·230	30·171	83	53	120·0	50·5	NW SE	10·4	
18	30·200	30·008	81	54	117·0	51·5	NW	·78	
19	29·963	29·902	76	50	74·0	52·5	NW	·26	0·75
20	30·222	30·142	75	50	94·0	49·0	SE	3·38	
21	30·293	30·267	62	51	104·0	46·5	SE	1·30	0·03
22	30·239	30·013	69	47	106·0	44·0	NW SE	1·04	
23	30·280	30·175	62	53	64·0	54·0	SE	1·30	0·03
24	30·278	30·211	64	53	97·0	50·0	NW NE	·78	
25	30·206	30·017	76	49	115·5	47·0	NW NE NW	·26	
26	29·857	29·839	80	60	115·5	47·	NW SE	·78	0·02
27	30·300	30·230	67	49	104·0	48·5	SW SE	3·64	
28	30·403	30·335	69	41	106·0	39·0	NW E	1·04	
29	30·380	30·322	74	46	108·5	40·0	NW N SE	1·56	
30	30·317	30·310	69	49	110·0	43·5	NW SE	1·04	
31	30·349	30·324	63	54	92·0	50·5	SW SE	·52	
Monthly mean 30·177			60·71		102·52	46·81	Total Force ..	47·33	0·94

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

5th—Tips of hornbeam commencing to turn brown.
10th—Coe's golden drop plum ripe.
10th—Seckle pear ditto
12th—Tips of elm turning yellow.
16th—Horsechestnuts leaves turning brown
18th—Common ash leaves commencing to fall.
20th—Oak leaves ditto. Acorns ripe.

Barometer mean, 30·177 in., being 0·322 in. above the average.
Temperature mean, 60·71°, being 0·95° above the ditto.
Solar intensity mean, 102·52°, being 0·77° below the ditto.
Dew point mean, 49·8°, being 0·58° above the ditto.
Humidity of air mean, ·68, being ·03 per cent. below the ditto.
Elastic force of vapour mean, ·360, being ·004 per cent. above the ditto.
Total amount of rain, 0·94in., being 0·73in. below the ditto.
Increase of spontaneous evaporation on rain fall, 3·48in.
Mean amount of ozone, 6·87, being 0·14 of chromatic scale below the ditto.
Electricity active on the 2nd, 5th, 6th, 7th, 8th, 11th, 13th, 20th, 22nd, 27th, 29th. 30th.
Thunder, lightning, and rain on 20th.
A rich display of Aurora on the 22nd.
***Aurora* and Southern lights frequent.**

ANALYSIS OF OBSERVATORY RECORDS, WITH HEALTH REPORT FOR MARCH. BY DR. E. SWARBRECK HALL.

More enjoyable weather than existed during this month could scarcely be possible. Sunny, with moderate temperature, abundant and gentle ozone-laden sea breezes, almost cloudless clear skies, with only one day of smart rain and five others with sprinkling showers, formed altogether such genial weather, that it well deserved the epithet of "heavenly" which our numerous visitors from the Australian Continent and other less favoured climates so rapturously affixed to it. Nevertheless most of the atmospherical phenomenon varied greatly from the mean character of the month, as exhibited by the Meteorological Records of the previous twenty-nine years.

Barometrical pressure mean exceeded the 25 years adopted standard average by + ·322 of an inch. Only once before in the previous 29 years had any month of the twelve a higher mean, *i.e.*, July, 1860, with 30·193 against 30·177 of the present month. High barometrical pressure in Tasmania is usually accompanied with a high death-rate, unless when counteracted by other more favourable atmospheric influences, as it was in the present month. Moreover, the extreme range of the pressure for the whole month was only ·662 of an inch, being less than ever before recorded for March, while the minimum 29·775 was far the highest ever before registered. Only seven times during the month did the range from noon to noon exceed a quarter of an inch, the highest being a rise of + ·433 on the 27th, which has been exceeded seven times out of the previous nine years. The maximum record 30·437 on the 11th has been exceeded six times in the previous 29 years.

The *Wind-force* total, 47·33 lbs. was — 5·76 lbs. below the average for this equinoctial month, but the falling off was entirely in winds from the points of the compass (northerly) least favourable to health. Gentle health-bearing sea breezes (southerly) prevailed to an unusual extent; 5 out of the 93 records being winds from south-east and south-west, and with one strong west wind, having more than two-thirds of the total force, with only the one day referred to on which the pressure to the square foot amounted to 5·21 lbs. There were only 18 *calms* registered being — 10·22 less than the March average.

Mean Temperature, 60·71 degrees, was less than one degree + 00·95) above the March average. The extremes of the self-registering maximum and minimum thermometers were respectively only 83 and 40, which have been exceeded –in the one above, and in the other below—frequently. The highest maximum for March being 99 in 1861, and the lowest minimum 38 in 1853, 1855, 1856. The *daily range*, however, was slightly (+ 1·02) above the March average, and with high atmospheric pressure and cold dry winds caused some cases of inflammation of the air passages, catarrh, bronchitis, pneumonia and croup, and had a fatal effect on long standing cases of pulmonary consumption.

The mean of *Solar Intensity*, notwithstanding the great prevalence of sunshine and the very small average of cloudy days was slightly (— ·77) below the average; and the extreme record 120 degrees on 2nd and 17th has frequently been much exceeded in former years.

Terrestrial-radiation mean 46·81 degrees, was — 1·34 below the average.

Elastic force of Vapour, 360, was + 4 above average, ranging from 217 to 534, and therefore adverse to health.

Humidity mean, 68, was only — 3 below the average, notwithstanding the dry sunny days and small rain-fall, but then the night dews were heavy.

Rainfall, ·94 of an inch was ·73 less than the average, ·75 of it fell on one day, the 19th, with heavier thunder and more brilliant lightningt han has been experienced for a long time in Hobart Town. This down-pour had the effect of cleansing the gutters, sewers, and drains of the city, which wanted it badly. February and March of this year conjointly have had less rainfall than any February and March upon record.

Spontaneous Evaporation, 4·42, was not much in excess above the averages.

Cloud mean, 4·32, was — 1·10 less than the 25 years' average, only two years in the previous 29 years had a smaller mean.

Ozone mean, 6·87, was only ·26 below the average of the previous twelve years, no year since 1862 having had so small a mean. With such a small rain-fall a much greater depression might have been expected, but fortunately for the public health sea breezes made amends for it.

Electricity was never absent at any of the recording hours, but negative greatly predominated.

The *Deaths* during the month were 47, being — 7 11-13ths less than the average of the previous 13 years. Only March, 1869, had a smaller number (42) and the maximum was 73 in 1864. Males were 26, females 21. Nine only were under one year old, 3 only between 1 and 5. Four were between 5 and 20. From 20 to 60 there were 14 deaths only, but from 60 to 93 there were 16. At the *Cascades* Prison and Invalid Station 8 deaths took place, aged from 40 to 79; at the *Brickfields* Invalid Station, only one, aged 93. At the *Hospital* there were 11 deaths, including two *Inquest* cases. *Consumption* caused 6 deaths, three being natives of Tasmania. No disease prevailed epidemically, but a youth of 18 died from Typhoid or Pythogenic fever, but more impressively designated "*filth-fever*" by the best sanitarians. From time to time deaths from this preventible disease are occurring in Hobart Town, and will continue to increase as the population becomes more aggregated, seeing how the excreta of the inhabitants are allowed to decompose in the middle of our habitations, and how insufficient is the system (if it deserves such an appellation at all) of sewerage. Formerly Typhoid Fever prevailed largely at the Queen's Asylum, at New Town, notwithstanding its incomparable site, sanitorily considered, but then the cloacæ were within the buildings, and their contents were removed by drains which passed beneath the buildings; now the cloacæ are away from the buildings, and their contents are removed almost daily. The dry earth conservancy would be a still greater improvement. Hobart Town, with its privy cesspools saturating the surface soil, and with its drainage channels in many places converted into receptacles for human execreta and other decomposing refuse, so valuable for manure, will ultimately become a perennial hot-bed for those zymotic diseases which prove such a drawback on the health of the towns and cities of the United Kingdom. Yet a more advantageous site for sanitary purposes, in one of the naturally healthiest climates in the world, few cities can boast of.

METEOROLOGY FOR APRIL, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·264	30·150	76	47	120·0	44·0	NW SW	·52	
2	30·211	30·183	69	49	106·0	47·0	NW SE	·52	
3	30·278	30·248	75	54	109·0	46·5	W SE	·52	
4	30·278	30·253	71	50	108·0	46·0	NW SE	1·04	
5	30·411	30·386	69	54	107·5	53·5	SW SE	1·04	
6	30·317	30·069	77	54	108·5	51·5	NW	·52	
7	30·010	29·939	78	59	109·0	57·0	NW	·78	
8	29·965	29·927	72	54	64·5	58·0	SE	·26	0·56
9	30·102	30·090	58	49	66·0	47·0	S N NW	·78	
10	29·829	29·673	71	53	107·0	50·0	NW SE	·52	0·50
11	29·918	29·724	67	54	105·0	53·5	NW	1·30	0·02
12	29·992	29·868	64	47	81·0	44·5	NW	1·04	
13	29·866	29·646	62	53	69·0	53·0	NW SE	·26	0·25
14	30·033	29·994	59	52	61·5	51·5	SE	0·	0·03
15	30·176	30·129	59	53	84·0	51·5	SE	·78	0·16
16	30·132	29·920	61	52	64·0	52·0	SE	·26	1·45
17	29·818	29·700	69	59	72·0	59·0	SE NE	·26	0·15
18	29·826	29·771	62	55	65·0	55·0	NW SE	0·	0·94
19	29·990	29·937	54	42	56·5	42·5	SE S	1·30	
20	30·060	29·998	57	46	64·0	41·0	SW SE	1·04	
21	30·136	30·087	64	45	99·0	41·5	NW SE	1·04	
22	30·061	29·830	57	43	66·0	37·5	NW NE	0·	
23	29·632	29·585	62	48	101·0	43·5	NW SE S	·52	0·02
24	29·895	29·580	56	47	94·5	42·5	SW	3·38	
25	30·300	30·216	54	40	90·0	34·5	NW SW SE	1·04	0·01
26	30·397	30·386	54	50	59·0	44·0	SW SE	·26	
27	30·371	30·305	59	49	89·0	46·5	SW SE NE	0·	0·02
28	30·247	30·126	59	45	90·0	42·5	NW SE	0·	
29	29·940	29·868	67	49	104·0	46.5	NW SE	·26	
30	30·164	30·060	59	49	72·0	44·0	SE SW	1·30	0·14
Monthly mean 30·045			57·21		86·13	47·57	Total Force ..	21·32	4·25

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th—Leaves of Elm (Ulmus campestris) commencing to fall.

15th—Chinese Chrysanthemum commencing to flower.

20th—Seeds of Hornbeam (Carpinus betulus) ripe; leaves of Mountain Ash commencing to fall.

25th—Ditto of Black Mulberry ditto ditto.

Barometer mean, 30·045 in., being 0·154 in. above the average.
Temperature mean, 57·21°, being 2·18° above the ditto.
Solar intensity mean, 86·13°, being 5·68° below the ditto.
Dew point mean, 49·3°, being 2·19° above the ditto.
Humidity of air mean, ·81, being ·05 per cent. above the ditto.
Elastic force of vapour mean, ·374, being ·149 per cent. below the ditto.
Total amount of rain, 4·25in., being 2·47in. above the ditto.
Increase of spontaneous evaporation on rain fall, 1·06in.
Mean amount of ozone, 7·01, being 0·02 of chromatic scale above the ditto.
A feeble amount of atmospheric electricity all through the month.
The apex of Mount Wellington covered with snow on the 23rd.
A great number of calms registered, and a small amount of wind force.

FRANCIS ABBOTT.

ANALYSIS OF OBSERVATORY RECORDS, AND HEALTH REPORT FOR APRIL. BY DR. E. SWARBRECK HALL.

In most respects the climatic character of this month has deviated widely from the normal standard, though on the whole most favorable to health and life.

Barometrical pressure mean, 30·045 was + ·154 above the mean for April. Only three times in the previous 29 Aprils has this high mean been exceeded, and that by very little. Altogether in the 30 years, the mean has only reached 30·000 and upwards eight times. At the same time the extreme range for this month was only ·826 of an inch ; the extremes being 30·411 maximum on the 5th, and on the 23rd, minimum 29·585. Equable high pressure was, therefore, the character of the barometrical records. Such phenomena are generally associated with an epidemic constitution of the air, but at this time such a tendency was checked by a copious rainfall, and the unusual predominance of sea breezes.

Wind-force had only a total of 21·32 lbs., being 25·36 lbs. below the April mean. Fifty-five out of the 90 records, were winds from the southerly points of the compass, with about two-thirds of the total force. South-east winds, the healthiest point, were 40 in number, being 26 above the April average, and with an aggregate force four times greater than usual. North-west, the least healthy point, was about the average in number, but much below it in force. Calms were 37, being 7 above the average.

Mean Temperature, both by the three daily observations and the maxima and minima self-registering thermometers, accorded more closely than usual; the former being 57·21 degrees, the latter 57·02. The mean is + 2·18 above the average for April. The *daily range*, 13·97 degrees, however, was — 3·25 less than the 25 years' average. Only two years in the previous 29 had a smaller daily range ; i.e., 1854 with 11·00 degrees, 1852 with 12·60. The extremes also were not great, maximum being 78 at mid-day on the 7th, minimum, 40 in the night of the 25th.

Solar Intensity mean 86·13 was — 5·68 degrees below the average, owing to the very cloudy and wet character of the month.

Terrestrial Radiation, on the other hand, was + 4·50 above the mean, being 47·57 degrees.

Elastic-force of Vapour ranged from 207 to 633, with a mean of 374, which is + 49 above the average, and would have been inimical to health, but for humidity and rain-fall.

Humidity mean, 81, was + 5 above the average.

Rain-fall 4·25 inches was + 2·47 above the April average, and fell in such a way as to be most beneficial to health and vegetation ; copious enough to cleanse the sewers, water courses, &c., yet not not so heavy as to cause floods. and commencing so gently as to saturate the soil gradually. The number of wet days, 13, were only slightly (+ 1·18) above the average. Only two Aprils in the previous 29 years had a greater rain-fall, 1856 with 5·01 inches, 1852 with 4·99 inches, 1860 with 2·86 inches, was the next highest. Notwithstanding the dry character of February and March, the fall of rain on the aggregate of the first four months of this year exceeds the average by + 3·61 inches. *Snow* existed on Mount Wellington on the 22rd and 24th.

Spontaneous-evaporation, with so little sunshine and winds, and so much rain and clouds, was much less than rain-fall, *i.e.*, 3·19 inches.

Cloud mean, 7·13, was + 1·39 above the average, contrasting remarkably with the previous month of March.

Ozone mean, 7·01, barely exceeded the average, notwithstanding the heavy rainfall and frequent sea-breezes. The gentle character of the latter accounts for this.

Electricity of a positive character was very small, and nils very numerous.

There were only 34 deaths, being nearly — 10 less than the April average of the previous 13 years. Seven (7) of these were under 1 year old ; two (2) from one to five, none from that to twenty-two, but between that and sixty, sixteen (16), the rest (9) were from sixty-eight to eighty-five years old. A girl aged twenty-two died from *Typhoid-fever*, and there was only one other death in the Zymotic class, a child aged three months, from *Diarrhœa*. *Consumption* caused four deaths, none of them born in Tasmania. *Scarlet-fever* of a mild type was pretty general, but without a death. *Cutaneous diseases* were very prevalent, a result no doubt of the previous long-continued dry weather.

METEOROLOGY FOR MAY, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	Rain in Inches.
	In.	In.	°	°	°	°			
1	30·339	30·300	55	27	85·5	34·5	NW NE SW	·52	
2	30·310	30·286	62	37	96·0	33·0	NW SW	·78	
3	30·386	30·356	63	37	96·0	34·0	NW E	·52	
4	30·286	30·029	60	43	81·0	36·5	NW	·78	
5	29·855	29·729	58	46	62·5	45·5	NW SW	·52	
6	29·792	29·779	58	46	88·5	43·0	SW NW	·78	0·05
7	29·810	29·715	67	48	95·5	44·0	NW	1·04	0·03
8	30·015	29·948	62	45	93·0	41·0	SW	1·30	0·03
9	30·107	30·089	64	40	92·5	33·0	W NW	1·04	
10	30·161	30·150	71	45	99·0	43·5	NW W	1·04	
11	30·266	30·230	68	37	94·0	36·0	NW SE	·26	
12	30·255	30·180	67	40	94·5	37·5	NW E SE	·26	
13	30·053	29·890	53	41	53·5	37·0	NW	0·	0·02
14	29·651	29·538	59	42	87·0	40·5	NW SE	·52	
15	29·559	29·540	64	46	91·0	36·5	NW	·78	
16	29·655	29·638	60	46	76·5	41·5	NW SW	·52	
17	30·070	29·958	54	43	54·0	38·0	SE	1·30	0·39
18	30·391	30·310	57	43	86·0	37·0	SW E SE	·78	0·03
19	30·360	30·311	51	40	62·5	39·0	NW SW	·26	
20	30·309	30·291	51	45	54·0	40 0	NW SW	0·	
21	30·319	30·269	57	45	86·0	34·0	NW SW	·52	
22	30·260	30·232	64	41	95·0	39·0	NW SE	·52	
23	30·211	30·102	64	42	95·5	38·5	W NW E	·52	
24	29·956	29·874	70	43	89·0	39·0	S NW SW	·52	
25	29·653	29·477	63	44	89·0	43·0	NW	1·30	
26	29·595	29·521	63	49	83·0	46·0	NW	5·47	0·02
27	29·926	29·778	63	47	87·0	42·0	NW	1·30	
28	30·448	30·360	67	42	91·0	36·5	SW NW	1·04	
29	30·529	30·460	65	36	89·0	35·0	NW SW	·78	
30	30·321	30·162	56	38	84·5	36·5	NW	·78	
31	30·109	29·946	62	42	79·0	40·5	NW	1·04	0·2
Monthly mean 30·054			51·63		83·95	38·74	Total Force ..	27·05	0·59

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th—First Medlar ripe.
21st—Coronilla Glauca commencing to flower.
25th—Photinia serrulata ditto ditto.
28th—Diosma alba ditto ditto
30th—Spiræa prunifolia ditto ditto ; Alianthus sericeus ditto ditto.

Barometer mean, 30·054 in., being 00·207 in. above the average.
Temperature mean, 51·63°, being 1·35° above the ditto.
Solar intensity mean, 83·95°, being 2·08° above the ditto.
Dew point mean, 42·08°, being 1·76° below the ditto.
Humidity of air mean, ·74, being ·02 per cent. below the ditto.
Elastic force of vapour mean, ·291, being ·011 per cent. below the ditto.
Total amount of rain, 0·59in., being 1·22in. below the ditto.
Increase of spontaneous evaporation on rain fall, 1·22in.
Mean amount of ozone, 6·08, being 0·72 of chromatic scale below the ditto.
Electricity active on the 8th, 9th, 10th, 17th, 27th, 28th, and 29th.

A light fall of snow on Mount Wellington on the 8th, the apex covered with ditto on 17th, which was not totally absent till the end of the month.

FRANCIS ABBOTT

X.

ANALYSIS OF OBSERVATORY RECORDS, AND HEALTH REPORT FOR MAY, WITH NOTE ON CENSUS OF 1870. BY DR. E. SWARBRECK HALL.

Most of the meteorological phenomena of this month deviate from the 25 years adopted standard, and though diseases of the respiratory organs prevailed extensively, the effect on the mortuary returns was but slight, the total mortality of the month being somewhat below the average of the previous 13 years, and no May of the previous six years having so small a number of deaths as the present month.

Atmospheric pressure mean, 30·054, was considerably (+ ·207) above the average, and had a wide range, with some very sudden and extensive rises and falls, within 24 hours, which told heavily on aged and enfeebled persons.

Wind-force 27·05 lbs., was — 10·80 lbs. below the May average, and northwest winds constituted nearly two-thirds of the numerical records, and more than two-thirds of the total strength.

Temperature mean. 51·63 degrees, was + 1·35 above the average, the extremes being 71 and 36.

Daily range of Temperature 18·45 degrees, was + 3·29 above the average.

Solar-intensity mean, 83·95 degrees, was + 2·08 above the average, the maximum being 99 degrees.

Terrestrial-radiation mean, 38·74 degrees, was 0·57 below the average, the minimum being 33 degrees.

Elastic force of Vapour mean, ·291, was — ·11 below the average.

Humidity mean, 74, was only — 2 below the average, though the rainfall was so small.

Rainfall, ·59 of an inch, was — 1·22 below the average, or about two-thirds less than the May mean, and the number of days on which it fell, was little more than one-half the usual rate.

Spontaneous-evaporation, 1·81 inches, was only equal to the usual rainfall for May, which of course resulted from the slight wind-force.

Cloud mean, 5.99, was + ·49 above the average.

Ozone mean, 6·08, was ·72 below the average, the natural result of the small rainfall and small force of the winds, and their predominance from the northwest quarter.

Electricity was noted "nil" only at three records. Negative greatly preponderated in frequency and strength.

Snow appeared on Mount Wellington several times during the month, but soon disappeared.

The *Deaths* amounted to 37, being — 3 7-13ths below the average of the previous 13 Mays. At and under one year old the deaths were six. From one to five there were three deaths. One of these, a child aged 4½ years, died from *traumatic tetanus*, resulting from a wound in the hand. From five to twenty there were only two deaths. From twenty to sixty the deaths were ten. At sixty and above, to ninety, there were sixteen deaths, a very large proportion indeed of the total mortality. No one disease influenced the mortality unduly, the cases being principally of a long standing chronic character.

The *Population* of the Hobarton Registration District, which includes, with the city, the Electoral Districts of Queenborough and Glenorchy, has undergone little numerical alteration on the totals between the census of 1861 and 1870. In the former the total was 24,773, in the latter 25,004. But in the constituent elements of age there has been a striking change. In 1861 all under 20 years of age amounted to 10,960 ; in 1870 the amount is 13,025. From 20 to 60 in 1861 there were 12,592. in the present year only 10,154. At 60 and all ages above there were in 1861 only 1221 ; in 1870 there were 1825. From 15 to 30, too, there has been a large increase of females, and a large decrease of males.

METEOROLOGY FOR JUNE, 1870.

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Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced. Highest.	Lowest.	Self-Registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in Inches.
	In.	In.	°	°	°	°			
1	29·942	29·937	58	46	60·0	43·5	SW SE	0·	0·17
2	30·034	29·992	54	38	77·0	37·0	NW	·52	0·04
3	29·974	29·575	62	36	86·0	33·5	NW	1·56	
4	29·430	29·326	55	42	82·5	37·0	NW W	3·64	0·32
5	29·733	29·661	55	41	61·0	38·5	NW	3·12	0·06
6	30·107	30·053	60	35	84·0	30·5	NW	·52	
7	29·800	29·621	62	46	79·5	41·0	NW	1·04	
8	29·740	29·687	62	44	86·0	38·0	NW	3·64	0·02
9	29·456	29·314	53	40	81·0	37·0	SW W	7·81	0·15
10	29·430	29·338	48	40	52·5	33·5	W SE SW	10·68	5·47
11	29·853	29·650	53	42	84·0	36·0	SW	13·62	0·34
12	30·119	30·090	64	42	90.0	36·0	NW W	·52	
13	30·106	29·952	58	45	82·5	35·5	NW NE NW	4·72	0·22
14	30·369	30·349	51	43	60·0	35·0	NW SE	·26	
15	30·500	30·458	52	31	76·5	30·5	NW	·78	
16	30·500	30·360	47	31	71·0	29·0	NW	·52	
17	30·271	30·150	63	39	84·0	32·5	E NW SE	·26	
18	20·842	29·692	65	48	76·5	41·0	SE NW	·52	0·36
19	29·814	29·752	63	40	87·0	34·0	NW NE SW	·26	
20	29·882	29·865	63	40	86·0	39·5	NW	·26	
21	29·969	29·903	57	39	59·5	37·5	NW	·52	
22	29·842	29·804	55	37	82·0	34·5	NW NE	·52	
23	29·987	29·832	63	36	83·5	34·0	NW	·52	
24	29·464	29·216	51	45	58·0	38·0	NW	·52	0·03
25	29·493	29·332	55	44	72·0	37·5	NW	1·56	
26	29·738	29·642	67	48	92·0	48·0	W SE NE	3·12	
27	29·700	29·477	66	45	87·0	41·0	NW	·52	
28	29·351	29·160	57	42	50·0	40·0	NW SW SE	5·47	
29	29·503	29·370	51	42	73·0	37·0	NW	·78	0·12
30	29·620	29·348	51	44	74·5	39·0	NW	·52	0·02
Monthly mean 29·789			48·59		76·02	36·83	Total Force ..	68·18	2·32

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet, and the force according to Lind's Wind Guage. The supposition, however, of an uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

15th.—Early Narcissus commencing to flower.
18th.—Maclaura Aurantiaca leaves falling.
19th.—Common Privet ditto.
20th.—Snow Flake commencing to flower.
24th.—Pyrus Japonica ditto ditto.
30th.—Black Mulberry leaves all shed.

Barometer mean, 29·789 in., being 0·092 in. below the average.
Temperature mean, 48·59°, being 1·84° above the ditto.
Solar intensity mean, 76·02°, being 1·08° above the ditto.
Dew point mean, 41·7°, being 0·46° above the ditto.
Humidity of air mean, ·78, being ·06 per cent. below the ditto.
Elastic force of vapour mean, ·265, being ·004 per cent. below the ditto.
Total amount of rain, 2·32in., being 0·49in. above the ditto.
Increase of spontaneous evaporation on rain fall, 0·79in.
Mean amount of ozone, 6·77, being 0·27 of chromatic scale above ditto.
Electricity active on the 8th, 9th, 25th, 26th, and 27th.
Mount Wellington covered with snow on the 4th, which continued through the month with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JUNE, 1870. BY DR. E. SWARBRECK HALL.

"The general character of the month was not propitious to life, and the deaths of adults, and particularly old people above 60 years old, were unusually large, while in children under 10 years of age, the deaths were remarkably few. Nevertheless, there was no prevailing sickness of an epidemic character.

"Atmospheric pressure mean, 29·789, was slightly — (0·92) below the 25 years' standard average for June. The range of the barometer, however, was very great, 1·340 inches, the maximum 30·500 occurring on the 15th and 16th; and the minimum, 29·160, on the 28th. The daily perturbations were also great. On 15 days the rises and falls exceeded one-quarter of an inch, the highest being a falls of ·503 on the 18th.

"Wind force total, 68·18lbs. was + 43·68lbs. above the June average. Only June 1866 had a higher force. At 62 out of the 90 records, north-west winds prevailed. West and south-west winds, though only 15 in number, were very strong, having about two-thirds of the total force for the month. The strongest winds had 5·21lbs. pressure to the square foot, and occurred six times.

"Temperature mean, 48·59 degrees, was + 1·84 above the average. The range was great, *i.e.* from maximum 67 on the 26th, to minimum 31 on the 15th and 16th.

"Daily range of temperature, 13·90 degrees was — 1·14 below the June average. Nevertheless, there were nine days on which the range exceeded 20 degrees between the extreme shade heat of the day, and the extreme cold of the night, the greatest being 26 degrees on the 3rd.

"Solar-intensity mean, 76·02 degrees, was + 2·08 above the average, despite the numerous cloudy and wet days. The maximum, 92, was recorded on the 26th.

Terrestial-radiation mean, 36·83 degrees was only + 0·20 above the average. The coldest night was that of the 16th, when the thermometer on the grass fell to 29 degrees, the air thermometer raised about four feet from the ground being 31 degrees. A considerable thickness of ice formed on still water.

"Elastic force of vapour mean, 265, was — 4 below the average; the range being from 148 on the morning of the 16th to 431 at noon on the 18th.

"Humidity mean, 78, was — 6 below the average.

"Rain fell to the amount of 2.32 inches, being nearly half an inch (·49) above the June average. It fell on 13 days—on some very heavily—being + 1·36 above the average. For the first six months of this year the rainfall has been very irregular, nevertheless the total fall, 13·02 inches, is + 2·88 inches above the 25 years' standard average.—Fortunately we have escaped floods, which have been so numerous and destructive on the Australian continent.

"Spontaneous-evaporation amounted to only 3.11 inches, notwithstanding the hot sunshine and strong winds.

"Cloud mean, 6·60, was + 1·09 above the average.

"Ozone mean, 6·77 was + 0·27 above the average.—Saturation (10) having been attained thrice i.e. on the 5th, 11th, 18th, with the heavy rains.—

"Electricity was weak and mostly of the negative kind, 46 out of 60 observations being so recorded, while 10 other records were *nil*, there being only 4 positives registered.

"Snow was never absent from Mount Wellington after the 4th day of the month, and on the 9th all the low hills around the City were coated with it.

"The deaths this month were 46, being a fraction above the average for the previous 13 years. Under one year old there were only five deaths. At one to five years old there was the unusually small number of one only, and the same at five to ten. At 10 to 20 the deaths were five. At 20 to 60 there were 16, being rather above the usual proportion. At 60 and all ages above, there were 18 deaths, which is a very large share indeed of the total mortality. The oldest was a man 88 years old, and two of the others were 82 each. No one disease prevailed, the deaths being principally in persons suffering from long standing disease of a chronic character. Consumption caused five deaths, one being a Tasmanian by birth, another a Russian from H.I.R.M. corvette Boyarin, two English, and one Irish. Two (2) deaths were caused by pneumonia, both in Hospital. The annual average from this disease for the last thirteen years is 35, out of a total average from all causes of 560. This is far less than the English proportion. Seven (7) inquests were held, two injured by falls, two by burns, and three apoplexy.

METEOROLOGY FOR JULY, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	29·646	29·568	55	46	84·5	40·0	W S S	·52	0·17
2	29·772	29·648	52	41	70·0	34·0	NW NE	8·33	0·03
3	29·792	29·734	56	42	80·0	36·0	NW SE W	·26	
4	29·980	29·958	57	34	78·0	30·5	NW	·26	
5	29·937	29·863	57	37	87·0	33·0	W NW N	·52	
6	29·766	29·573	67	41	91·0	39·0	NW	·78	0·02
7	29·787	29·728	57	42	72·5	39·0	W NW	·78	
8	29·957	29·930	58	44	84·0	42·5	NW	1·04	
9	30·103	30·087	64	44	88·0	40·5	NW	·78	
10	30·169	40·141	62	48	81·0	44·5	NW	·78	
11	30·341	30·183	58	44	03·0	41·0	SE E	·26	
12	30·591	30·560	50	41	60·0	38·0	NW E	0·	
13	30·610	30·558	61	45	85·5	37·0	NW NE NW	·26	0·08
14	30·534	30·464	55	36	78·0	34·0	NW	1·30	
15	30·432	30·321	57	34	80·5	32·5	W NW	1·04	
16	30·339	30·184	58	40	76·0	35·5	NW NE	·52	
17	30·219	30·102	54	38	62·0	34·5	NW	0·	
18	30·050	29·865	53	46	55·0	43·0	SE NE NW	0·	0·68
19	29·834	29·813	56	46	85-0	40·5	NW SW S	·78	0·50
20	29·930	29·922	53	46	62·0	42·0	SW S SE	·26	0·50
21	29·864	29·815	50	41	69·0	37·5	NW S	·52	0·03
22	29·858	29·848	50	42	66·5	38·0	SE S SW	1·04	0·05
23	29·992	29·966	55	40	86·0	38·0	S SE	·52	
24	30·185	30·152	59	34	84·0	30·0	SW NW	·73	
25	30·177	30·100	50	36	69·5	30·5	NW NE	5·99	
26	29·924	29·655	58	39	81·0	32·0	NW N NW	2·60	0·13
27	29·756	29·506	55	42	61·0	40·5	NW SW SE	·52	
28	30·061	30·000	58	36	88·0	32·0	NW SW	·52	
29	30·102	30·100	52	36	70·5	30·0	NW W NW	·52	
30	30·100	30·071	48	36	52-0	33·0	NW S	0·	0·26
31	30·036	30·030	48	46	50·0	40·5	SE E SE	·26	0·16
Monthly mean	30·008		48·23		74·34	36·74	Total Force ..	31·74	2·61

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

7th.—Arbutus unedo commencing to flower.
14th.—Garrya elliptica ditto ditto.
15th.—Morus alba commencing to break into leaf.
20th.—Common Almond in full flower.
28th.—Yellow Crocus ditto ditto.

Barometer mean, 30·08 in., being 0.164 above the average.
Temperature mean, 48·23, being 2·51 above the ditto.
Solar intensity mean, 74·34°, being 1·17° below the ditto.
Dew point mean, 39·06°, being 1·00° below the ditto.
Humidity of air mean, ·78, being ·05 per cent. below the ditto.
Elastic force of vapour mean, ·262, being ·005 per cent. above the ditto.
Total amount of rain, 2·61in., being 0·55in. above the ditto.
Increase of rain fall on spontaneous evaporation, 0·54in.
Mean amount of ozone, 6·31, being 0·78 of chromatic scale below ditto.
Electricity active on the 3rd, 7th, 10th, 13th, and 28th.
A copious amount of snow on Mount Wellington all through the month, with frequent fresh deposits.

FRANCIS ABBOTT.

XV.

NOTES ON METEOROLOGY AND MORTALITY OF JULY, 1870.

BY DR. E. SWARBRECK HALL.

Though the character of the month, climatically considered, was abnormal, the deaths were much below the average, and never before were the deaths under 20 years of age so few.

Atmospheric pressure mean, 30·008, was + ·164 above the 25 years' adopted standard. Only four out of the 25 years had a mean above 30 inches, *i.e.*, 1841, 30·005; 1848, 30·003; 1850, 30·113; 1860, 30·193. In the latter year epedemic influenza prevailed, and the deaths of the month were enormous —114—the 13 years' average for July being only 56. The daily perturbations were not nearly so great as in June, neither was the month's range, 1·104, so extensive. The maximum of the barometer, 30·610, occurred on the 13th, and the minimum, 29·506, on the 27th. Only twice in the last 29 years has the maximum been higher, that is — 30·643, 1844; 30·812, 1846; the last being the highest record of the barometer for any month during all these years. Old people and invalids succumbed in great numbers to the great atmospheric pressure of this month, but it had no lethal influence on children, or young and healthy adults.

Wind force had a total of 31·74 lbs., being — 7·81 lbs. below the July average; 50 out of the 93 records were winds from the north-west, with two-thirds of the total force, therefore least favorable to health. The highest pressure to the square foot, 5·21 lbs., occurred with a north-west wind at the evening record of the 26th inst.

Temperature, by the observed thermometers, had a mean of 48·23 degrees, which is + 2·51 above the July average. By the self-registering maximum and minimum thermometers the mean was 48·16 degrees; so near a correspondence between these two sets of instruments is of rare occurrence. The maximum was 67 on the 6th; the minimum 34 on the 4th, 15th, 24th. Five times only in the 25 years was a higher maximum recorded, and the same minimum, but none higher, was only recorded five times.

The *wet-bulb* thermometer had a mean of 44·76, which is + 1·64 above the average.

Daily range of temperature mean was, 14·81, degrees being — ·30 below the average. The greatest range was 26 degrees on the 6th, the smallest 2 degrees on the 31st.

Solar Intensity mean, 74·34 degrees, was — 1·17 below the average, which is to be accounted for by the cloudy and wet character of the month. The maximum, 91 degrees, was noted on the 6th.

Terrestrial Radiation mean, 36·74 degrees, was + 1·19 above the average. On the nights of the 24th and 29th this thermometer fell to as low as 30 degrees. In June there was a record one degree colder.

Elastic Force of Vapour mean, 262, was + 5 above the average; the range in the month was from 165 to 377.

Humidity had a mean of only 78, which is — 5 less than the average, notwithstanding the excessive rainfall.

Rain occurred on 12 days which is — 1·73 less than the average, but the amount was 2·61 inches, which is + ·55 above the mean. On the three days 18th, 19th, 20th, the rain fell in large quantities, but so gently as not to cause any approach to a flood. *Snow* was never absent from Mount Wellington during the month, and received frequent copious additions.

Spontaneous Evaporation amounted to 2·07 inches only.

Cloud Mean was 7·34 being, + 1·94 above the average.

Ozone Mean 6·31, was — ·78 below the average, which is to be accounted for by the prevalence of north-west winds. Saturation was attained on two of the rainy days with southerly winds.

Electricity was 43 times out of the 62 records registered as negative, 15 times "Nil," and only 4 times positive.

The *Deaths* amounted to 39, being — 17 less than the July average of the previous 13 years, and 9 less than July 1869 had. There was only one death under 14 years of age, a child aged 6 months, from a very unusual cause—Intussusception of the bowels. From 14 to 20 there were only 2 deaths—so small a mortality under 20 years of age is without precedent in the records of Hobart Town. At all times the deaths on the average, at this period of life, are much below those of England, and the Colonies on the continent of Australia. From 20 to 60 the deaths were 19; and from 60 to 90, there were 17. In July, 1869, the deaths under 20, were 14, and over 20, 33. Up to the 13th day of the month, there were only 9 deaths, on that day and the 19th the maximum of 3 each occurred. Before, and on the 20th, there were 7 days on which no deaths took place. After the 20th, not a day without one or two deaths, three having one and the rest two. *Consumption* caused 5 deaths, one a sailor, a native of the Sandwich Islands, the other four all Tasmanian born. Never before have there been so many deaths of Tasmanians from this disease in any single month. A death in hospital took place from *tetanus* in a man brought up from the Huon, where he had suffered a compound fracture of the bones of the leg; he survived upwards of a week in hospital; the limb was not amputated. Only one *inquest* was held during the month. In the *Zymotic* class of diseases there was not a single death, which, hitherto, is unprecedented.

METEOROLOGY FOR AUGUST, 1870.

PRIVATE OBSERVATORY, HOBART TOWN

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·116	30·100	48	40	65·0	36·0	SE SW	·26	
2	30·120	30·005	49	38	79·0	33·5	W SE S	·26	0·03
3	29·819	29·702	57	37	84·0	34·0	NW NE SW	·52	0·08
4	29·722	29·670	58	37	89·5	33·5	NW SE	·52	
5	29·613	29·363	56	33	85·0	31·5	NW	·52	
6	29·020	28·852	55	41	82·0	35·5	NW SW S	5·73	0·22
7	29·566	29·390	49	38	68·5	33·0	NE S SW	·26	
8	29·858	29·835	59	34	91·0	29·5	NW SW	·78	
9	29·912	29·848	52	35	69·5	30·5	W E SE	·26	0·01
10	29·808	29·712	58	32	83·0	28·5	NW	1·04	
11	29·769	29·724	69	39	90·5	31·5	NW	·52	
12	29·475	29·313	59	38	79·0	30·5	NW	·52	
13	29·375	29·212	61	44	90·0	39·0	NW	·78	0·09
14	29·278	29·049	56	46	84·0	32·0	NW	·52	0·08
15	29·123	29·007	53	40	84·5	37·0	NW	1·30	
16	29·370	29·368	58	40	82·5	37·5	NW	·52	0·13
17	29·267	29·081	63	41	90·5	36·5	NW	10·94	0·05
18	29·290	29·117	63	40	92·5	36·0	NW	·78	
19	29·485	29·375	60	36	93·0	33·5	SW W NE	·78	0·01
20	29·766	29·718	64	41	90·5	37·0	NW	1·04	
21	29·606	29·483	61	44	83·0	41·0	NW W	3·12	0·02
22	29·721	29·626	65	50	95·5	36·5	NW	·52	0·02
23	30·109	30·061	61	40	95·0	36·0	W NE SE	·52	
24	30·100	29·959	63	34	89·0	31·5	NW SE	·26	
25	30·037	30·016	68	40	96·0	34·5	NW SE	·52	
26	30·081	30·026	60	52	81·0	36·5	NW E	0·	0·14
27	30·062	30·052	56	41	74·5	40·0	NW E	·26	0·12
28	30·328	30·230	63	43	97·0	37·5	NW E SE	·78	0·02
29	30·402	30·369	62	44	91·0	40·0	NW SE	·52	
30	30·375	30·300	56	46	79·0	43·5	S NW SW	3·64	
31	30·453	30·444	63	36	95·5	31·5	NW NE E	1·04	
Monthly mean 29·723			49·17		85·65	34·98	Total force	39·81	1·02

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—Sambucus niger commencing to break.
16th.—Esculus hippocastanum ditto ditto.
,, Gooseberry ditto ditto.
20th.—Ulmus campestris commencing to flower.
26th.—Lombardy Poplar commencing to break.
27th.—Royal Apricot commencing to flower.

Barometer mean, 29·723 in., being 0·084in., below the average.
Temperature mean, 49·17°, being 1·10° above the ditto.
Solar intensity mean, 85·65°, being 10·13° above the ditto.
Dew point mean, 38·6, being 2·78 below the ditto.
Humidity of air mean, ·74, being ·06 per cent. below the ditto.
Elastic force of vapour mean, ·009 per cent. below the ditto.
Total amount of rain, 1·02in., being 0·81in. below the ditto.
Increase of rain fall on spontaneous evaporation, 0·83in.
Mean amount of ozone, 5·97, being 1·55 of chromatic scale below ditto.
Electricity active on the 1st, 8th, 9th, 11th, 13th, 17th, 18th, 21st, 23rd, 25th, and 31st.
Aurora Australis on the 21st, 22nd, and 23rd.
Snow never absent from Mount Wellington, with frequent fresh deposits.

FRANCIS ABBOTT.

NOTES OF METEOROLOGY AND MORTALITY OF AUGUST, 1870.

BY DR. E. SWARBRECK HALL.

The weather this month deviated much from the normal standard, and the deaths were above the average, and embraced a due proportion in every group of ages.

Atmospheric pressure had wide, sudden, and frequent variations, though the mean, 29·724, was — ·083 below the 25 years' adopted August standard. The month's range was 1·601 inches, being the highest recorded for the last 10 years. The maximum was 30·453, recorded on the 31st. The minimum, 28·852, was registered on the 6th. Only thrice in the last 30 years have there been lower minima. Between 1 p.m. of the 5th to that of the 6th, the barometer fell — ·620 of an inch, and rose + ·607 in the following twenty-four hours. On twelve other days the rises and falls exceeded quarter of an inch.

Wind pressure was 39·81 lbs., being — 6·68 below the August average. Out of the 93 observations, north-west winds prevailed 55 times, with 24·98 lbs. of the pressure. The strongest wind was a north-west gale on the 17th, having a pressure of 10·42 lbs. to the square foot. The *calms*, 36, were a few fractions only above the average.

Temperature mean, 49·17 degrees, was + 1·10 above the 25 years' mean by the observed thermometers, and by the self-registering only + ·18 of a degree more. The maximum record was 68 degrees on the 25th, and the minimum 32 on the 10th.

The *wet-bulb thermometer* had a mean of 44·84 degrees.

Daily range of temperature mean was 18·71 degrees, being + 2·28 above the 25 years' standard. The greatest range on any day was 29 degrees, recorded on the 24th.

Solar intensity mean, 85·65 degrees, was + 3·87 above the average. The maximum was 97 degrees on the 28th.

Terrestrial radiation mean, 34·98 degrees, was — 0·82 below the average. In the night of the 10th, the temperature by this thermometer fell to 28·5 degrees.

Elastic force of vapour mean, 259, was — 9 below the average.

Humidity mean, 74, was — 6 below the average.

Rainfall, 1·02 inches, was — ·81 below the average, though the number of days on which it fell—14—was slightly above the average.

Snow was never absent from Mount Wellington during the month, and received frequent additions.

Spontaneous evaporation amounted to 1·85 inches.

Cloud mean, 5·97, was + ·27 above the average.

Ozone mean was only 6·57, being — ·95 below the average. On the 15th only was saturation—10—recorded. With so little rain and wind, and such a predominance of winds from the worst quarter, the air could not be as pure as usual.

Electricity—There were 19 records of "positive" from 4 to 7 in strength; 39 "negative" from 1 to 7, and 4 "nils."

The *Deaths* amounted to 49, being + 3 3-13ths above the 13 years' average for August. Seven were under one year old; 1 from 1 to 5; 2 from 5 to 10; 2 from 10 to 20; 18 from 20 to 60; and 15 at all ages above 60, the oldest being two females, 84 years old each. The contrast of 16 deaths under 20 years old this month, with only 3 in July, is very remarkable. There were 4 deaths in the *zymotic* class of diseases, but no epidemic disease prevailed. One of these deaths was in a girl, 15 years old, from *typhoid-fever* with ulceration of the bowels and peritonitis, indicating exposure to local insanitary conditions, which are gradually intensifying in the city owing to want of efficient sewerage and scavenging. This fever is denominated "filth-fever" by the Registrar General of England, and ranks among his list of deaths from *preventable* causes. A death from *tetanus* (lock jaw) in a man severely burnt was remarkable. It occurred in Hospital, being the second death from this rare disease this winter, though in different wards. *Consumption* caused 6 deaths, two of them born in Tasmania. There were 4 inquests.

METEOROLOGY FOR SEPTEMBER, 1870.

Private Observatory, Hobart Town.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced. Highest.	Lowest.	Self-Registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in Inches.
	In.	In.	°	°	°	°			
1	30·539	30·448	62	34	91·0	32·0	NW SW	1·30	
2	30·419	30·226	59	41	77·0	35·0	NW E	0·	
3	30·048	29·910	65	47	91·0	44·5	NW	·52	0·01
4	30·199	30·060	66	48	102·0	43·5	NW NE SE	·78	
5	30·336	30·313	66	39	94·0	38·0	NW	1.56	
6	30·197	29·964	67	52	79·0	46·0	NW	3·12	
7	29·924	29·847	65	56	75·0	52·5	NW	·52	0·17
8	29·533	29·230	61	53	62·0	51·0	NW SE	·52	1·75
9	29·443	29·298	55	47	60·5	42·0	SW	5·72	0·17
10	29·782	29·706	58	45	95·5	40·0	SW S SE	3·64	
11	29·844	29·837	57	43	95·0	37·5	NW SE SW	1·30	
12	29·869	29·801	64	45	103·0	40·5	W S NW	·52	
13	30·087	30·014	58	40	90·0	33·5	SW SE	1·04	0·01
14	30·186	30·079	61	38	85·5	34·0	NW SE	·52	
15	30·061	29·863	67	40	98·0	35·5	NW	8·07	
16	29·829	29·747	59	51	77·0	47·5	NW SW	·52	0·25
17	30·095	30·071	56	43	92·0	38·0	NW SE	1·30	0·09
18	30·039	29·976	63	39	98·0	32·5	SW SE	1·30	
19	30·011	29·865	68	40	98·5	36·5	NW NE SE	1·04	
20	30·126	30·022	59	43	94·5	41·0	SW SE	3·12	
21	30·172	29·865	69	35	100·0	32·0	NW	1·56	
22	29·500	29·491	59	50	83·0	47·0	NW SE	·52	0·53
23	29·970	29·864	53	39	81·5	35·0	SE SW SE	5·72	0·05
24	29·966	29·812	59	39	96·0	34·5	NW NE SE	·78	0·03
25	29·724	29·575	65	37	99·5	35·0	NW N	·78	
26	29·508	29·446	70	47	100·0	40·5	NW W	1·04	0·08
27	29·476	29·451	59	43	68·5	39·0	NW	·78	0·08
28	29·621	29·524	65	43	105·0	40·5	NW W	1·30	
29	29·784	29·768	58	47	75·5	41·5	NW	1·30	
30	29·650	29·472	66	49	102·0	39·9	NW	13·54	
Monthly mean 29·871			52·69		88·97	39·50	Total force	63·73	3·17

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—Ash commencing to break into leaf.
18th.—Grape vine ditto.
21st.—Oak ditto.
22nd.—Moutan peony commencing to flower.
27th.—Horsechestnut ditto.
30th.—Robinia pseudo acacia commencing to leaf.

Barometer mean, 29·871 in., being 0·110in., above the average.
Temperature mean, 52·69°, being 1·93° above the ditto.
Solar intensity mean, 88·97°, being 0·93° above the ditto.
Humidity of air mean, ·72, being ·04 per cent. below the ditto.
Dew point mean, 41·9°, being 0·27° below the ditto.
Elastic force of vapour mean, 284, being ·005 per cent. above the ditto.
Total amount of rain, 3·17in., being 1·091in. above the ditto.
Increase of rain fall on spontaneous evaporation, 0·66in.
Mean amount of ozone, 6·97, being 0·99 of chromatic scale below ditto.
Electricity active on the 1st, 4th, 5th, 10th, 11th, 12th, 13th, 15th, 20th, 21st, 23rd, 25th, 26th, 28th, 29th, and 30th.
Aurora Australis on the 21st, 23rd, 24th, and 27th.
Snow never absent from Mount Wellington, with frequent fresh deposits.

FRANCIS ABBOTT.

XX.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF SEPTEMBER, 1870.

BY E. SWARBRECK HALL.

In many respects the weather this month deviated from the September average. The barometer was considerably above the mean, and very fluctuating. The wind was in more constant motion than usual, but below the average strength. Temperature was above the average. Rainfall was considerably above the mean, though it fell on fewer days. Ozone was much below the average. Nevertheless, though the mortality was but little short of double the number that occurred in September, 1869 (which, however, was the smallest for any month in the year for the 13 years recorded), yet it was above twelve per cent. less than the average of the previous 13 years' Septembers.

Atmospheric pressure mean, 29·871, was + ·110 above the 25 years' standard average. It ranged from the maximum 30·539 on the 1st, to minimum 29·230 on the 8th. The greatest movement in any twenty-four hours was a fall of — ·494 of an inch between 1 p.m. of the 21st and 22nd. There were movements on ten other days exceeding one-fifth of an inch.

Wind force amounted to 63·73lbs. which is—8·80lbs. below the September average. *North-west* winds had 49 records out of the 90, with 35·91lbs. of the strength. *South-west* had 13 records with 16·12 of the strength. *South-east* had 18 records, with only 8·06 of the total force. *Calms*, nevertheless, were only 17 in number, being — 15·45 less than the average. The strongest wind, 10·42lbs., was noted on the last day of the month, and was from the *north-west*.

Temperature mean, 52·69 degrees, was + 1·93 above the average. The maximum was 70 on the 26th, the minimum 34 on the 1st. The *wet-bulb thermometer* mean was 47·86, being +1·29 above the average.

Daily range of temperature mean, 18·20, was only + ·56 of a degree above the average. The greatest range on any day was 34 degrees on the 21st.

Solar intensity mean, was 88·97, only × ·43 above the average. The maximum record was 105 degrees on the 28th.

Terrestrial radiation mean, 39·50 degrees, was +1·11 above the average. Twice in the month, on the 1st and 21st, the thermometer fell to freezing point (32.)

Elastic force of vapour mean was 284 + 5 above the average. It ranged from 164 on the 1st to 453 on the 7th.

Humidity mean, 72, was + 4 below the average notwithstanding the excessive rainfall.

Rain fell to the amount of 3·17 inches, being + 1·09 above the average. On five of the days, three of which were continuous, 2·87 inches fell, yet without causing any flood in Hobarton. *Snow* was never absent from Mount Wellington during the month, and received frequent and copious additions.

Spontaneous evaporation, 2·51 inches, was considerably below the rainfall, an unusual event for the equinoctial month.

Cloud mean, 6·09, was + ·25 above the average.

Ozone mean, 6·97, was 99 below the average. Only on one day, the 9th, was saturation (10) attained; this was the last of the three continuously wet days.

The *Electrometer* records were :—Twenty *positive* with tension from 4 to 6; negative, 36, with tension 1 to 7; and 4 "nils." On fine nights in the last eight days of the month, there were brilliant displays of the Aurora Australis.

The *deaths* in the month were 37, being 5 less than the September average of the previous 13 years, though + 15 more than September 1869 had. Four (4) were under one year old, one from 1 to 5, three from 5 to 10, none from 10 to 20, thirteen (13) from 20 to 60, and sixteen (16) at 60 and all ages above, the oldest being a spinster aged 85 years. Altogether there were eight deaths at and above 70 years old. No epidemic disease prevailed, and only 7 of the total deaths from all causes were from diseases of an acute character. *Consumption* caused three deaths, two of them natives of Tasmania, the third a Swedish sailor. No deaths occurred at the *Brickfields Invalid Station*, but four invalids died at the *Cascades Station*. The death-rates at these two establishments differ widely. During the nine past months of this year, the Cascades has had 33 deaths of adults, ranging from 39 to 90 years old, while at the Brickfields there have been only 19, ranging from 62 to 93 years old, or, including one sent to hospital, 20. Possibly the daily average strength of the invalid paupers of the Cascades, may have been twenty to thirty more than at the Brickfields, but then the average age of the latter is so much greater. The average ages of the deaths were respectively:—For the Brickfields, a little above 76 years: at the Cascades only a trifle above 68. No doubt the reluctance of invalids to be sent to the Cascades, and the difficulty of retaining them there, may, to some extent, be explained by the comparatively excessive mortality there. On sanitary grounds, this old misplaced prison is an unfit place for invalids and children, and now that the Military Barracks are likely to become available for colonial use, they would afford cheerful, healthy, and very eligible quarters for both the afore-named classes.

METEOROLOGY FOR OCTOBER, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade	Highest in sun.	Lowest on grass	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·556	29·510	67	47	101·0	40·5	NW	3·38	
2	29·821	29·813	61	44	99·0	38·0	NW	10·94	
3	30·015	29·942	64	49	99·0	46·0	NW N	1·56	
4	30·160	30·109	68	52	107·0	43·0	NW	1·04	
5	30·150	29·999	74	41	110·0	37·5	NW SE	1·04	
6	29·776	29·749	75	53	110·5	46·5	NW E	10·68	0·16
7	29·897	29·879	70	49	83·0	47·0	SE E	·52	0·04
8	30.061	30·015	66	44	105·0	35·5	NW E SE	·78	
9	29·792	29·477	66	44	95·0	42 0	NW SW	2·86	0.52
10	30·087	29·858	54	42	86·0	37·0	SW SE	1·30	0.01
11	30·330	30·293	69	39	109·0	33·5	NW NE SE	1·04	
12	30·412	30·361	69	44	107·0	39·5	NW SE	1·56	
13	30·224	30·004	74	47	109·0	42·5	NW	5·72	
14	29·984	29·907	75	50	111·0	42·0	NW SE	·52	0·21
15	29·945	29·866	60	44	97·5	40·0	E NE SE	·52	
16	30·084	30·000	64	47	94·0	37·0	NW SE	1·04	0·24
17	30·258	29·230	59	43	91·0	39·5	NW SE	·52	0,01
18	30·297	30·262	64	48	104·0	41·0	SW SE	1·04	
19	30·239	30·015	64	47	103·5	39·0	NW NE	·78	0·42
20	29·465	29·256	73	62	109·0	47·5	SE NW W	·78	0·05
21	29·417	29·283	64	50	88·0	47·5	NW NE NW	1·04	0·22
22	29·787	29·418	61	47	89·5	44·0	NW W	15·62	0·29
23	30·078	30·052	71	49	110·0	38·5	NW SE	·52	
24	30·145	29·952	70	44	110·0	43·0	SE	·52	
25	29·854	29·793	74	53	99·0	51·0	NW SE NW	·78	
26	30·255	30·148	62	43	101·0	41·5	N SE	3·38	
27	30·294	29·977	71	46	103·5	45·0	NW	3·12	0·07
28	29·779	29·600	81	52	113·0	50·0	N E NW	·78	0·07
29	29·574	29·451	79	58	85·0	55·5	NW	·78	
30	30·056	29·774	71	54	114·0	50·0	SW W SE	8·33	0·03
31	30·241	30·150	72	48	109·5	42·5	NW SE	1·44	
Monthly mean 29·939			57·96		101·71	42·68	Total force	80·53	2·34

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th.—Carpinus betulus commencing to break into leaf.
19th.—Ailanthus glandulosa ditto ditto.
24th.—Tilia Europea ditto ditto.
25th.—Morus niger ditto ditto.
28th.—Seeds of Elm commencing to fall.
31st.– Melia azederach commencing to break.

Barometer mean, 29·939 in., being 0·155in. above the average.
Temperature mean, 57·96°, being 4·02° above the ditto.
Solar intensity mean, 101·71°, being 6·11° above the ditto.
Dew point mean, 46·6° being 2·2° above the ditto.
Humidity of air mean, ·68, being ·05 per cent. below the ditto
Elastic force of vapour mean, ·328, being ·028 per cent. above the ditto.
Total amount of rain, 2·34in., being 0·37in. above the ditto.
Increase of spontaneous evaporation on rainfall, 2·20in.
Mean amount of ozone, 7·10, being 0·82 of chromatic scale below ditto.
Electricity active on the 2nd, 3rd, 18th, 19th, 23rd, 26th, 30th, and 31st.
Aurora on the 12th and 25th.
More or less snow on Mount Wellihgton all through the month.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF OCTOBER, 1870.

By Dr. E. Swarbreck Hall.

On the whole the weather this month was favourable to health, the deaths being considerably below the average, and nearly half of them persons above 60 years old.

Atmospheric pressure was very high with wide ranges, and as is usual was very fatal to feeble, diseased, and aged persons. The mean 29·939, was + ·155 above the average. The extreme range was from 30·412 on the 12th to 29·256 on the 20th. On fourteen days the mutations exceeded one-fifth of an inch. On the 20th it was nearly three-fourths of an inch (·526), both days of heavy floods in Victoria, though with only a moderate rainfall here.

Wind-force, 80·53lbs., was, 19·42lbs below the October average. North-west winds had 44 out of the 93 records, with more than half of the total forces. The strongest wind, 10·42lbs. pressure to the square foot, was from the west on the 22nd. There were 18 calms, being + 2·72 above the average.

Temperature, 57·96 degrees, was + 4·02 above the mean. The maximum 81 occurred on the 28th, the minimum 39 on the night of the 11th.

Daily range of temperature mean, 29·39 degrees, was + 1·72 above the average. On the 5th the extreme range occurred being 33 degrees.

Solar-Intensity mean, 101·71 degrees, was + 6·11 above the average. The hottest day was the 30th when the thermometer in the sun rose to 114 degrees.

Terrestrial Radiation mean, 42·68 degrees, was + 0·69 above the average. The lowest temperature by this thermometer was 33·5 degrees in the night of the eleventh.

Elastic force of vapour mean, 328, was + 28 above the average. The range was from 104 on the 22nd to 581 on the 29th.

Humidity mean, 68, was — 5 below the average, notwithstanding the copious fall of rain.

Rainfall, 2·34 inches, was + ·37 above the average. It fell on 14 days which is only—·90 below the average. The greatest amount on any day was ·52 of an inch on the 9th, and the next was ·42 on the 19th. Other days also had sufficient to flush the drains and sewers, but none were heavy enough to cause floods. Health and vegetation were promoted by this genial rainfall. Snow was never absent from Mount Wellington during the month, and received frequent additions.

Spontaneous evaporation occurred to the amount of 4·54 inches, being nearly double the amount of rainfall, as might be expected with so much sunshine and wind.

Cloud mean, 5·68 was — ·02 below the average.

Ozone had a mean of 7.10 which is - ·02 below the average. The predominance of the north-west winds no doubt was the cause of this.

The *Electrometer* records were positive 19, with tension from 2·5 to 8; negative 36, with tension from 1 to 6; nils 7.

The deaths in the month amounted to 34, being—19 3-13ths less than the average of the previous 13 years, and 15 less than October 1869 had. Under one year of age there were five deaths, the oldest being only seven weeks, the other four from twelve hours to nine days. From one to five years old there were four deaths; from five to ten, one only; from ten to twenty the deaths were two; from twenty to sixty only six, while in October, 1869, there were twenty-one. At sixty and all ages above the deaths were sixteen, the oldest being a woman eighty-four years old. At all ages it is very remarkable how large a proportion were males—twenty-eight to six females. There were only three inquests, two of them cases brought to hospital from other districts; including these there were only six deaths in the public hospital. Both invalid establishments at the Cascades and the Brickfields had four deaths each, the mean age of each being respectively 59¾ and 72¼. In the *Zymotic* class of diseases there was only one death, a child aged between three and four years from *Diphtheria*. *Consumption* caused three deaths, two of them, aged ten and fifteen years, were natives of Tasmania.

METEOROLOGY FOR NOVEMBER, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In	°	°	°	°			
1	30·009	29·847	71	50	96·0	47·5	NW SE NW	1·30	0·06
2	29·860	29·784	68	49	82·0	47·0	SE E NW	1·04	0·07
3	29·945	29·915	65	44	105·0	42·0	NW SE	1·30	
4	29·907	29·810	72	45	111·0	43·5	NW SE	1·56	0·12
5	29·560	29·424	75	52	114·5	49·0	N NW SW	3·38	
6	29·648	29·620	68	46	99·5	44·5	NW	10·41	0·01
7	29·810	29·684	68	49	110·0	48·0	SE W SE	2·86	
8	29·800	29·694	73	47	106·5	40·0	NW	5·46	
9	29·910	29·875	68	51	90·5	48·0	NW WS	1·04	
10	29·847	29·805	69	47	94·0	44·5	NW	1·30	0·03
11	29·879	29·782	63	51	95·0	50·0	SE	·78	0·80
12	29·687	29·635	55	48	57·0	50·0	SE	1·30	0·60
13	29·593	29·558	52	48	51·0	47·0	S SE	3·64	0·62
14	30·009	29·903	58	45	100·5	40·0	SE	1·30	0·01
15	30·042	30·014	62	48	92·0	42·5	NW E SE	1·04	0·07
16	30·240	30·118	54	42	63·0	41·0	NW SE	1·04	0·04
17	30·339	30·324	63	48	99·0	42·5	NE SE	·78	
18	30·378	30·253	70	53	100·5	50·5	N NW NE	1·04	
19	30·195	29·969	77	54	110·0	51·5	NW E	·78	
20	29·910	29·767	77	53	113·0	51·5	NW SE	1·30	0·27
21	29·676	29·522	65	53	67·0	50·5	NE SW SE	1·04	1·92
22	29·685	29·649	57	48	70·0	45·0	SE	10·41	0·03
23	29·698	29·530	60	45	101·0	40·5	NE NW	1·30	
24	29·798	29·758	69	47	105·0	42·0	NW	1·56	
25	29·659	20·150	68	50	75·0	47·0	NW	10·68	0·13
26	29·632	29·546	67	43	97·0	40·0	NW	5·72	
27	29·929	29·890	57	39	97·5	37·5	NW SW	1·56	
28	29·876	29·796	64	45	101·0	43·5	NW SW W	1·04	0·01
29	29·834	29·655	70	50	112·0	42·0	W NW	1·30	0·02
30	29·530	29·515	66	48	91·0	45·0	N NW	3·38	0·01
Monthly mean 29·816			57·63		90·26	45·12	Total Force ..	85·59	4·82

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—First strawberry (British Queen) ripe.
17th.—First cherry (May Duke) ripe.
20th.—Black mulberry in blossom.
25th.—Punica Granatum in flower.
30th.—First raspberry (Red Antwerp) ripe.
Ditto.—Bougainvillœa spectabilis in full flower

Barometer mean, 29·816 in., being 0·095 in. above the average.
Temperature mean, 57·63°, being 0·09° above the ditto.
Solar intensity mean, 90·26°, being 11·55 below the ditto.
Dew point mean, 47·4, being 0·93 above the ditto.
Humidity of air mean, ·70, being ·01 per cent. below the ditto.
Elastic force of vapour mean, ·329, being ·004 per cent. above the ditto.
Total amount of rain, 4·82in., being 1·98in. above the ditto.
Increase of rainfall on spontaneous evaporation on rain fall, 0·88in.
Mean amount of ozone, 6·93, being 0·63 of chromatic scale below the ditto.
Electricity active on the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 16th, 18th, 24th, 26th, 27th, 28th, 29th, and 30th.
Auroras on the 19th, 20th, and 24th.
cloudy and humid all through the month.

FRANCIS ABBOTT

XXV.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF NOVEMBER, 1820.

BY E. SWARBRECK HALL.

Atmospheric pressure and temperature this month closely approximated to the mean of the 25 years' adopted standard, but rainfall was largely in excess, the weather on the whole being highly propitious to health and life. No November of the previous 13 years had so small a number of total deaths. More especially were the deaths of young and middle-aged people the most remarkable for their extreme rarity.

Atmospheric pressure mean, 29·816, was + 095 only above the 25 years' adopted standard mean. The maximum, 30·378, occurred on the 18th; the minimum, 20·150, on the 25th. The extreme range, 1·228 inches, has often been exceeded. On the 14th there was a rise of the barometer of + ·432 of an inch, and on nine other days movements exceeding one-fifth of an inch.

Wind-force, 85·95 lbs., was—26·74 below the average, November being on the whole the windiest month in a year. It was more continuous and steady than usual, there being only four calms recorded, which is—5·67 below the average. The strongest winds, 5·21 lbs. pressure only to the square foot, were noted five times. *North-west* winds were recorded 41 times out of the 90 observations, and had rather more than half of the total force. Winds from *south-east* to *west*, the points most favourable to health, were nearly equal to the former both in frequency and force. *North*, *north-east*, and *east* were few and feeble.

Temperature mean, 57·63 degrees, only deviated from the 25 years' mean by the scarcely appreciable difference of an excess of + 00·09. The *wet-bulb* mean, 52·06, was + 00·21 only above the mean. The maximum shade temperature of the self-registering thermometer, 77, was noted on the 19th and 20th. This is the lowest maximum since November, 1853, when 75 was recorded, and only one other year, 1846, had a lower maximum than the present, *i.e.*, 76. In 1869 it was as high as 95. The minimum, 35, was registered on the 27th. The lowest ever before was 38 in several years. The extreme range, 38 degrees, was very small, though last year had the same, but only one other, 1863, had less, *i.e.*, 37.

Daily Range of temperature had the mean of 17·17 degrees, being — 1·31 below the average; last year's was more than two degrees higher, and no year since 1855 had one so small. The greatest range for any day was 27 degrees, noted on the 4th. In 1861 the greatest range was the same, but every year since has greatly exceeded this year's.

Solar Intensity mean, 90·26 degrees, was — 11·55 below the average, and the lowest on record, which is in a great measure accounted for by the rainy and cloudy character of the month. The maximum record was made on the 5th, being 114·5 degrees.

Terrestrial Radiation mean, 45·12 degrees, was — 1·37 below the average. No other year, except 1867, had so low a mean. The lowest temperature in any night was 37·5 degrees. Many years have had lower minimums than this.

Elastic force of Vapour mean, 329, was + 4 above the average. It ranged from 225 to 494 during the month.

Humidity mean, 75, notwithstanding the excessive rain-fall was — 1 below the average.

Rain-fall amounted to 4·82 inches, being + 1·98 above the 25 years' mean; but this was twice exceeded within the previous 29 years, *i.e.*, 1849, — 8·94 inches; 1842, — 5·84 inches. There were 18 days on which the rain fell, which is + 5·18 more than the average. On the three days, 11th, 12th, 13th, the aggregate fall was 2·02 inches, but on the 24th 1·92 was registered. Still it fell so steadily that no damage of any moment was inflicted, and the thorough cleansing it gave the streets, sewers, and rivulet was highly advantageous to health. No *snow* could be seen on Mount Wellington from the city during the month, but visitors up there on the 9th reported its presence in patches.

Spontaneous Evaporation amounted to less than the rain-fall, *i.e.*, 3·94 inches.

Cloud Mean, 7·70, was + 1·64 above the average, being the greatest on record in 30 years.

Ozone Mean, 6·93, was — ·63 below the average. On four of the wet days saturation (10) was registered.

Electricity records were 23 positive, with tension from 3·5 to 8; 33 negative, with tension from 1 to 8; and 4 nils. No thunder or lightning observed. On three nights the Aurora Australis was seen.

The *Deaths* registered were only 24, being—15 12-13 below the average of the preceding 13 years, and the smallest number for any November of the thirteen. The November average of deaths is the smallest of any month in the year. In the *Hospital* there were 8 deaths inclusive of an *Inquest* case, the only inquest in the month. All these cases were admitted from rural districts. Never before has it happened that no deaths of residents in the Hobarton Registration District took place in hospital. Of the 24 deaths 6 were respectively aged 1 day, 5 weeks, 8 weeks, 9 weeks, 3 and 4 months. Between the last and 17 years old, not a single death! One at 17, another at 20, and a third at 22 were all that took place, until 39, at which age there was a death, and 4 more between that and 60 years old; from 60 to 86, at which age the oldest took place, there were 10 deaths. So small a proportion of young and middle-aged persons was never before recorded. There was not a single death in the *Zymotic* class of diseases, except two babes, registered as dying from *diarrhœa and convulsions*, can be properly considered to belong to this class. There were 2 deaths from *consumption*, one a youth, aged 22, born in Hobart Town, the other a man aged 60, born in England. From the details I have given it will be seen that out of a population of 25,000 persons in the Hobart Town Registration District only 16 died, being at the rate of less than 8 per 1,000 per annum, or 192 total deaths in the year. The annual average for the previous 13 years, *including* cases brought to hospital from other districts, is 560; the first year of the thirteen (1857) having 581, and the last (1869) only 462. The diminished death-rate of late years, where from the changes in the ages of the population, there ought, by the ordinary laws of mortality, to have been an increased death-rate (*Vide* report for May), cannot be ascribed solely to improved climatic conditions. Local sanitary improvements must claim a considerable share in the diminution, and of these our improved water-supply, I have data to prove, has been most influential. Were our scavenging and sewerage so amended as to ensure the speedy removal of all animal and vegetable refuse, our dead no longer interred amidst the living, and the ventilation of our abodes and public places of assemblage better attended to, Hobart Town would be, as it ought to be, one of the healthiest towns in the world, its local and climatic advantages being unparalleled. No country with whose meteorological condition I have become acquainted, equals ours in the purity of its atmosphere, as tested by the ozonometer.

METEOROLOGY FOR DECEMBER, 1870.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	29·750	29·692	65	45	107·0	43·5	NW W	3·38	
2	29·885	29·788	66	51	107·0	50·0	NW SE SW	3·38	0·2
3	30·068	30·04	65	46	110·0	42·0	N SW	1·04	
4	29·867	29·665	64	48	69·0	46·0	NW	3·72	
5	29·606	29·567	68	45	109·0	41·0	NW SE E	·78	
6	29·400	29·195	86	50	125·0	50·5	N NW	18·23	
7	29·612	29·372	77	52	111·0	50·0	NW SW	3·64	0·03
8	29·742	29·647	66	46	103·0	43·0	NW W	6·23	0·12
9	29·985	29·929	67	46	98·0	42·0	NW	1·56	
10	30·063	30·019	69	46	101·0	43·5	NW NE SE	·26	
11	29·879	29·722	86	55	125·0	44·0	SE	·26	
12	30·013	29·927	68	50	110·0	47·0	E SE	1·04	
13	29·826	29 775	72	48	111·5	45·5	E SE	1·04	
14	29·676	29·563	71	50	109·0	46·0	NW	·78	
15	29·963	29·924	71	52	103·0	46·5	SW SE	1·56	
16	29·932	29·823	78	52	110·0	47·0	NW SE	·78	
17	29·675	29·625	82	57	112·0	51·5	NW	10·94	
18	30·617	29·955	74	49	112·0	46·0	SE NE	3·64	0·07
19	29·810	29·676	67	52	108·0	45·5	W SW	5·72	
20	29·910	29·767	66	44	108·0	43·0	NW	1·30	
21	29·843	29·737	66	48	112·0	43·5	W SE SW	1·30	
22	30·025	30·015	65	45	109·0	41·0	NW SE	1·30	
23	30·084	30·063	70	45	113·0	41·0	NE SE	1·04	
24	30·239	30·186	64	49	103·5	43·5	SE	1·30	
25	30·319	30·311	68	50	111·0	43·0	SW SE SW	1·30	
26	30·330	30·300	68	49	95·0	47·5	NW SE	·78	
27	30·263	30·117	75	46	115·5	43·5	NW SE	1·04	
28	30·124	29·939	75	49	115·0	47·0	NW NE	1·04	
29	29·918	29·783	81	53	121·0	49·0	NW SE NE	1·04	
30	29·763	29·558	71	58	76·0	57·0	NE	·26	0·20
31	29·774	29·567	68	52	69·0	50·0	SE	3·64	0·01
Monthly mean 29·863			61·51		106·30	4595·	Total force	85·34	0·55

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

12th.—Red currants commencing to ripen.
14th.—Common privet commencing to flower.
17th.—Black currants commencing to ripen.
24th.—Melia azederach commencing to flower.
25th.—Doyenne d'Ete pear commencing to ripen.
31st.—Juneating apple ditto ditto.

Barometer mean, 29·813 in., being 0·068in., above the average.
Temperature mean, 61·51°, being 0·39° above the ditto.
Solar intensity mean, 106·30°, being 2·33° above the ditto.
Dew point mean, 47·9°, being 1·12° below the ditto.
Humidity of air mean, ·63, being ·05 per cent. above the ditto.
Elastic force of vapour mean, ·341, being ·011 per cent. above the ditto.
Total amount of rain, 0·55in., being 1·181in. below the ditto.
Increase of rain fall on spontaneous evaporation, 3·88in.
Mean amount of ozone, 5·45, being 1·74 of chromatic scale below ditto.
Electricity active on the 1st, 3rd, 4th, 7th, 8th, 9th, 10th, 15th, 18th, 19th, 20th, 21st, 22nd, 23rd, 25th, 28th, and 29th.
Aurora Australis on the 10th, 16th, and 29th.
Much wind from S.E. and N.W.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF DECEMBER, 1870.

BY DR. E. SWARBRECK HALL.

Many of the meteorological phenomena of this month approximated very closely to the standard normal mean ; others, however, differed widely from the average, but the general result was favourable to health and life.

Atmospheric pressure mean, 29·863, was +·118 above the 25 years' adopted standard mean for December. Only twice before in the previous 30 years, had December a higher atmospheric pressure mean. The maximum, 30·330, occurred on the 26th, and the minimum, 29·195, on the 6th the extreme range of the month, therefore, being 1·135 inches. In December, 1855, the range was 1·518 inches, being the only year which exceeded the present one. The greatest range of the barometer in any twenty-four hours was a fall of —·395 of an inch on the 6th. Only twice before in the previous 15 years was there a lower range in a similar period of time in the month of December. On 14 other days, however, there were variations of the barometer exceeding one-fifth of an inch.

Wind-force amounted to 85·34 lbs, being—2·08 below the average. Light sea breezes predominated in number, but north-west in aggregate force. On the 6th and 17th there were north-west *hot winds*, with a force of 10·42 lbs each. *Calms* were 15 being + 2·11 above the average.

Temperature mean, 61·51 degrees, was only + 00·39 above the mean, and the self-registering thermometers gave a much lower mean, than the observed ones. The *wet-bulb thermometer* mean, 54·26, was —·72 below the mean. The extremes of temperature were, 86 with a hot wind on the 6th, and minimum of 44 in the night of the 20th.

Daily-range of temperature had a mean of 21·65 degrees, which is + 1·74 above the average greatest range was 36 degrees on the 6th.

Solar-intensity mean, 106·30 degrees, was + 2·33 above the average. The hottest record was 125 degrees on the 6th.

Terrestrial-radiation mean, 45·95 degrees, was — 2·29 below the average, the coldest record being 41 degrees on the nights of the 5th, 22nd, and 23rd.

Elastic-force of vapour mean, 341 was 11 degrees below the average. The range was from 235 to 492.

Humidity mean, 63, was — 5 below the average.

Rain-fall amounted to only ·55 of an inch, being —1·18 inches less than the average. On only one occasion, in the night of the 30th, did sufficient fall to flush the water courses and sewers. *Snow* was never visible from the city on Mount Wellington during the month.

Spontaneous-evaporation amounted to 4·43 inches.

Cloud mean, 6·14, was + ·53 above the average.

Ozone mean, 5·45, was 1·74 below the average, and the smallest ever recorded for the month of December.

Electricity records were 30 positive, with tension from 3 to 7·5 ; negative 32, with tension from 2 to 6·5. No *thunder* or *lightning* during the month. The *Aurora Australis* seen four times.

The *deaths* this month were 36, being — 8 9-13 below the average of the previous 13 years. Out of the thirteen only 1865 had fewer (30); 1864 had the same in number as the present month; all the rest had more. Under one year old there were 7 deaths; from 1 to 5 the deaths were 4 ; from 5 to 10 no deaths; from 10 to 15 there were 2 deaths ; and 2 also from 15 to 20. Altogether the deaths under twenty years old form an unusually large proportion of the total deaths. From 20 to 60 there were 12 deaths; and at 60, and all ages above, 9, the oldest being 79 years old. The deaths in Hospital were 7, four of which were from other districts, and another was a sailor. The *Brickfields* and *Cascades* establishments had each 3 deaths. There were 3 *Inquests*. In the *Zymotic* class of diseases there were 5 deaths : —Four children from *Diarrhœa*, and one young woman from "*low fever.*" One of the Hospital deaths was from *Tetanus* (lock-jaw), whether traumatic or idiopathic is uncertain. It is remarkable that the boy's father died from the same disease some years ago. The boy's sufferings were greatly mitigated by the Hydrate of Chloral, a medicine lately introduced as a powerful hypnotic. *Consumption* caused 2 deaths, one Tasmanian born.

The total deaths in the registration district of Hobarton, during 1870, were 500. The population at the census on the 7th February, 1870, was 25,004, the death-rate therefore was 20 per 1,000. Nearly 6,000, however, of the population is extra-urban and purely rural. On the other hand 45 of the deaths are known to have been of persons not belonging to the district, and 70 others were invalids collected from all parts of the island, and concentrated within two establishments in the district. It may therefore be fairly calculated that about 400 was the actual number of deaths of persons belonging to the district, being at the rate of 16 per 1,000 per annum. The Registrar-General of England assumes 17 per 1,000 to be the normal death-rate, being that of the 65 healthiest districts of England and Wales. The average of the total deaths in the Hobarton Registration District for the 13 years, 1857, 1869, was 564 8-13, the year 1858 having the largest number, 644; and 1869 having the smallest, 462. Of the 500 deaths in 1870, January had the greatest number, 64, November the smallest, 25. No disease prevailed epidemically, and the deaths in the Zymotic class of diseases were only about one-tenth of the whole. From the records of the 13 years ending 1869, the mean mortality of each month is as follows:—January, 49 1-13; February, 54 6-13, which considering the small number of days in that month, is the most fatal month in the year; March, 54 11-13; April, 41 1-13; May, 40 7-13; June, 45 9-13; July, 56, this is numerically the most fatal month, but not so if the number of days is calculated. Moreover, an epidemic of influenza in July, 1860, when 114 deaths were recorded, principally of old people, swells the average of this month differently to any other of the months. Excluding this very fatal month, the average of the other 12 years is only 50 4-12 August, 45 10-13; September, 42; October, 43 6-13; November, 39 12-13, being the least fatal month to life; December, 44 9-13. In the year 1870 the deaths in each month under 5 years old, were:—January, 23; February, 18; March, 12; April, 9; May, 10; June, 6; July, 1; August, 12; September, 6; October, 9; November, 6; December 11; total 123. This is a very small proportion of the total deaths at all ages, according to the laws of mortality in England and Europe generally. At 60 and all ages above, the oldest being 93 years old, the deaths were:—In January, 16; February, 13; March, 16; April, 9; May, 17; June, 18; July, 18; August, 15; September, 16; October, 16; November, 11; December, 9; total, 174. The hot months are most fatal to children, the cold months to old people. By the census in February, 1870, there were 3,402 children under five years old enumerated in the Hobarton Registration District, and at 60 and all ages above, 1825. It is very remarkable that while the constituent elements of the population as to age, have year after year, been increasing in the proportionate numbers of the very young, and the very old, the total death-rate has been decreasing. By the ordinary laws of mortality it should be otherwise. This proves that our climatic advantages have heretofore been under-estimated, not exaggerated, and that the native-born have a much less death-rate than the imported inhabitants.

METEOROLOGY FOR JANUARY, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced.		Self-Registering Thermometers.				Wind.		Rain in Inches.
	Highest.	Lowest.	Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Direction from three daily registers.	Force in lbs. per square foot.	
	In.	In.	°	°	°	°			
1	30·149	30·090	57	46	92·0	43·0	E	1·56	0·05
2	30·222	30·191	63	48	99·0	45·0	NW SE	·78	
3	30·315	30·283	63	50	101·0	47·5	SE	1·56	
4	30·286	30·242	59	50	70·5	48·0	SE	1·56	
5	30·149	30·002	68	54	89·0	52·0	NW SE E	·78	
6	29·979	29·909	74	56	110·5	54·0	N SE	1·04	
7	30·065	30·054	67	55	77·5	55·0	SE	1·04	
8	29·974	29·859	72	53	114·5	50·5	NE SE E	·78	
9	29·874	29·844	73	50	107·0	49·0	NE SE	·78	
10	29·871	29·839	77	52	118·0	51·0	NW SE	1·04	
11	29·845	29·719	76	56	87·0	54·0	NW	1·04	0·19
12	29·426	29·408	80	60	120·0	59·0	NW	5·46	
13	29·484	29·381	74	58	99·0	54·5	NW W	3·12	
14	29·465	29·380	62	48	84·0	42·0	NW W	3·38	0·04
15	29·765	29·692	62	43	97·0	40·0	NW SW	3·12	0·02
16	29·857	29·807	68	48	106·0	46·0	NW SW	1·30	
17	30·130	30·086	71	43	110·5	38·5	NW SE	1·04	
18	30·169	30·033	82	48	120·0	46·5	NW SE	1·04	
19	29·987	29·875	95	63	130·0	55·0	NW NE SE	1·04	
20	30·217	30·195	73	56	111·0	50·5	SE	1·56	
21	30·194	30·073	86	54	125·0	53·0	NW SE	·78	
22	30·059	29·853	92	54	130·0	57·0	NW N	1·30	
23	29·847	29·783	89	54	120·5	59·0	NW SE S	3·64	0·71
24	29·895	29·868	68	54	72·0	49·5	SE	·78	0·02
25	29·871	29·756	81	53	123·0	50·0	NW SE	1·04	
26	29·810	29·623	86	57	120·5	51·5	NE NW SE	1·04	0·18
27	29·825	29·562	76	57	108·0	50·0	NW SW	3·64	
28	30·015	29·764	75	43	114·0	41·5	NW SE NW	1·04	
29	29·683	29·554	77	61	112·5	56·0	NW	1·30	
30	29·774	29·651	80	51	116·5	48·5	NW W SE	1·04	
31	29·734	29·689	58	56	115·5	50·0	NW	1·04	0.04
Monthly mean 29·877			64·90		106·45	49·71	Total force	49·66	1·25

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Gauge. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be considered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

10th. Veronica angustifolia in flower.
11th.- First Apricot (Roman) ripe.
12th.—Grevillea robusta in flower.
14th.—Jargonelle Pear commencing to ripen.
19th.—Black Mulberries ditto ditto.
Catalpa syringæflora not flowering this year.

Barometer mean, 29·887 in., being 0·160in. above the average.
Temperature mean, 64·90°, being 2·06° above the ditto.
Solar intensity mean, 106·45°, being 3·19° below the ditto.
Dew point mean, 51·2° being 0·65° above the ditto.
Humidity of air mean, ·64, being ·03 per cent. below the ditto
Elastic force of vapour mean, ·393, being ·020 per cent. above the ditto.
Total amount of rain, 2·25in., being 0·11in. below the ditto.
Increase of spontaneous evaporation on rainfall, 2·94in.
Mean amount of ozone, 5·43, being 1·44 of chromatic scale below the ditto.
Electricity active on the 1st, 2nd, 3rd, 13th, 14th, 15th, 16th, 17th, 22nd, 27th, 28th, 30th, and 31st.

4th.—The apex of Mount Wellington covered with snow.

19th.—Thunder; 23rd, thunder, lightning, and rain; 26th, much thunder and lightning, both sheet and fork, with rain.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF JANUARY, 1871.

By E. Swarbreck Hall.

The year 1871 opened with weather of a very anomalous character, there being a considerable covering of snow on Mount Wellington, and a fresh cold south-east wind, with sprinkles of rain. Nevertheless, the mean temperature of the whole month was above the average, and nearly every other of the records departed more or less from the adopted mean. On the whole, this month —following the very dry one of December—was not very favourable to health and life, the deaths being within a trifle of the 14 years' average.

Atmospheric pressure had the mean of 29·887, being + ·160 above the 25 years' adopted standard. With the exception of 1868, when the mean was 29·918, the present year's January was the highest of 31 years now on record. The maximum, 30·315, was registered on the 3rd; the minimum, 29·380, on the 14th, the extreme range of the month being ·935 of an inch. The greatest movement of the barometer in any 24 hours, was a rise of + ·458 on the 1st, and there were only seven other days on which it exceeded one-fifth of an inch — so that, tolerably steady, but high atmospheric pressure, may be deemed characteristic of the present month.

Wind-force total was only 49·66lbs., which is—28·63lbs. less than the average for January. Both in number and force, the ozone-bearing sea breezes from the south-east to west far exceeded all from the other four points of the compass, and, no doubt, to a great extent counteracted other phenomena less favourable to health. At no one record was a stronger pressure to the square foot recorded than 2·60lbs. There were 15 *calms*, being —1·90 less than the average. The 19th, 22nd, 26th were *hot-winds*, very weak in point of wind-force, but very hot as to temperature.

Temperature mean, 64·90 degrees, was + 2·06 above the 25 years' average, and hotter than any January since 1863. The extremes of temperature were : —Maximum, 95 degrees on the 19th (only one other above 90), and minimum, 43 on the 15th, 17th, 28th. The *wet-bulb* thermometer mean was 57·56, being + 1·18 above the average.

Daily range of Temperature mean was 21·71 degrees, being + ·95 above the average. The greatest was 38 degrees on the 22nd.

Solar-intensity had the mean of 106·45 degrees, being — 3·19 below the average. This is singular enough, for the cloud mean was but a trifle above the average, and the month was not a hazy one. The maximum was 130 degrees, on the 19th and 22nd.

Terrestrial-radiation mean, 49·71 degrees, was—1·53 below the average; the coldest night being the 17th, when this thermometer fell to 38·5 degrees.

Electric-force of vapour, 393, was + 20 above the average, and the highest noted since January 1863. It ranged from minimum 245 on the morning of the 15th to maximum 592 at noon on the 25th.

Humidity mean was 64, and — 3 below the average.

Rain fell on 8 days being — ·64 below the average. The quantity gauged was 1·25 inches, being — ·11 less than the average. More than half of it (·71) fell on the 23rd, being a thunderstorm. *Snow*, to a considerable amount, covered the summit of Mount Wellington on the morning of the 1st, but did not last long. A frost deposit appeared again on the 14th.

Spontaneous Evaporation amounted to 4.19 inches.

Cloud mean was 5·89, being + ·19 only above the average.

Ozone mean, 5·43, was —1.44 less than the average. It is the lowest record ever made for January. The maximum was 8 on the 1st and 24th, with south-east breezes. The minimum was 3 on the 21st.

The *Electricity* records were, 18 positive, with tension ranging from 2 to 8; Negative 44, with tension from 1 to 6. No "nils." *Thunder and Lightning* were observed on the 23rd and 26th, both grand displays, and of rare occurrence of late years. *Lightning* only was seen on the 15th. *Thunder* only heard on the 19th.

The *deaths* in the month were 47, being — 3 2-14th less than the average of the previous 14 years, but 17 less than 1870 had. Under one year old there were 17 deaths, many of them only a few days old. From nine months of age to 21 years, there was only one death, and that from accident to a girl 7½ years old, run over on Regatta Day. This is a very remarkable and unusual exemption at this season of the year in this group of ages. From 20 to 60 the deaths were 14 ; and from 60 and all ages above, 15, the oldest being 82. There were six deaths in hospital, four of them being from other registration districts. There were six inquests. At the Cascades invalid establishment there were two deaths, but none at the Brickfields. In the zymotic class of diseases there were 12 deaths, one from diphtheria, all the rest from diarrhœa. Pulmonary consumption caused two deaths, both aged persons, respectively born in England and Ireland.

METEOROLOGY FOR FEBRUARY, 1871.

PRIVATE OBSERVATORY, HOBART TOWN.

Day of Month.	Bar. 37 feet abv. sea level corrected & reduced. Highest.	Lowest.	Self-Registering Thermometers. Highest in shade.	Lowest in shade.	Highest in sun.	Lowest on grass.	Wind. Direction from three daily registers.	Force in lbs. per square foot.	Rain in inches.
	In.	In.	°	°	°	°			
1	30·015	29·952	69	47	109·0	45·0	NW SE	1·04	
2	30·034	29·839	79	48	120·0	46·0	NW SE	1·04	
3	30·052	29·938	71	54	101·0	51·5	NW W SE	1·30	
4	30·148	30·107	68	52	108·0	51·0	SW SE	1·30	
5	30·071	29·970	76	55	119·5	50·0	N SE	1·04	
6	30·009	29·889	80	49	116·0	46·5	NW SE	1·04	0·15
7	29·687	29·298	72	60	73·0	58·0	NW	·26	0·41
8	29·795	29·312	70	56	94·0	48·5	NW SW SE	2·86	
9	30·065	30·057	67	47	90·0	46·0	NW SE	·52	
10	30·014	29·852	78	47	114·0	44·5	NW SE	1·30	
11	29·879	29·852	75	49	112·0	46·5	NW	1·30	
12	29·974	29·897	76	50	113·0	46·5	NW SE	·78	0·3
13	29·821	29·535	83	54	118·0	51·5	NW SE	·26	0·20
14	29·501	29·417	79	52	112·5	49·0	NW	5·72	
15	29·868	29·734	69	48	100·0	46·0	NW SE NW	1·04	
16	30·063	30·010	69	51	108·0	47·5	SE	1·04	
17	30·055	30·029	75	53	113·0	48·5	NW SE S	1·04	
18	30·098	29·931	79	53	98·0	51·5	NW NE	2·60	
19	29·787	29·525	86	52	120·0	52·5	NW	10·68	0·18
20	29·854	29·662	75	57	114·0	48·0	NW SW NW	·78	
21	30·156	30·129	75	52	113·5	50·0	NW SE	1·30	
22	30·087	29·851	78	47	114·0	45·0	NW E NE	·52	
23	29·779	29·709	80	50	118·0	47·5	NW SE	1·04	
24	29·797	29·769	79	60	117·0	55·0	NE SE	1·04	
25	29·980	29·860	72	57	73·0	56·5	SW SE	1·30	0·33
26	30·126	30·099	60	52	64·5	50·0	SE E	0·	
27	30·026	29·839	76	54	110·0	50·5	NW	1·30	
28	29·774	29·582	82	50	112·0	49·5	NW SE E	·52	0·05
Mean monthly 29·879			64.56		106·25	49·23	Total Force	.. 43·96	1·35

The mean in all cases is taken from the sums of the three daily registers, and not from the maximum and minimum.

The direction of the wind is registered from currents moving at a height of 192 feet and the force according to Lind's Wind Guage. The supposition, however, of a uniform velocity during the month is a very arbitrary one, and the results can be con sidered only approximately correct.

The relations of the quantities of rain which fell under the different winds are registered each evening at sundown.

The 25 years' standard tables are used for obtaining the difference from the average.

Leafing, Flowering, and Fruiting of a few Standard Plants in the Royal Society's Gardens during the month.

6th—Kerry pippin apple commencing to ripen.
8th—Windsor pear ditto.

15th—Bon Chretien pear commencing to ripen.
16th—Green gage plum ditto.
25th—Common ash commencing to shed seed.
26th—Sycamore ditto.

Barometer mean, 29·819in., being 0·036in. below the average.
Temperature mean, 64·56°, being 4·80° above the average.
Solar intensity mean, 106·25°, being 2·96° above the average.
Dew point mean, 51·2°, being 1·98 above the average.
Humidity of air mean, ·65, being ·06 per cent. below the average.
Elastic force of vapour mean, ·390, being ·034 above the average.
Total amount of rain, 1·35in., being 0·32in. below the average.
Increase of spontaneous evaporation on rain fall, 2·87in.
Mean amount of ozone, 5·08, being ·193 of chromatic scale below the average.
Electricity active on the 5th, 8th, 9th, 10th, 11th, 14th, 15th, and 20th.
Hot wind on the 19th. Thunder and rain on the 28th.

FRANCIS ABBOTT.

NOTES ON THE METEOROLOGY AND MORTALITY OF THE MONTH OF FEBRUARY, 1871.

By Dr. E. Swarbreck Hall.

The atmospherical phenomena of the month varied considerably from the 25 years' adopted standard mean for February, but were not on the whole unfavourable to health and life. The deaths were twelve less in number than the average of the previous 14 years, and six less than February, 1870, had.

Atmospheric pressure mean, 29·879, was × ·048 only above the mean. The greatest pressure on any day was, 30·156, on the 21st; and the lowest was, 29·298, on the 7th. The month's range therefore was only ·858, being less than in any February since 1863. The greatest movement of the barometer in any 24 hours was a fall of — ·448 on the 7th, which was not unusual in any respect. There were, however, 10 other days on which the variations exceeded one-fifth of an inch.

Wind-force in the aggregate amounted to 43·96 lbs., being — 13·14 less than the February average. *North-west* winds predominated over all others, both in frequency and force, and were greatly in excess of the February mean. On the other hand *north* wind was only noted once, and without force (a calm); while the February average is 14·11 in number, 8·21 in force. *South-east* winds were considerably more numerous than usual, but a trifle below the average force. The strongest winds, 5·21 lbs. in force, were noted twice on the 19th, and were north-west *hot winds*. *Calms* were + 5·33 above the February mean.

Temperature mean, 64·56, was + 2·68 degrees above the 25 years' mean, only 1866 and 1855, during the past 30 years, had higher means, *i.e.*, 65·19 and 68·00 respectively. Maximum, 86, was noted on the 19th. It has often been exceeded. Minimum, 47, was recorded four times, being the highest, with the exceptions of 1866, 1845, 1843, 1841, in the previous 30 years. The *wet-bulb* thermometer mean, 57·45, was + 1·74 above the mean.

Daily-range of Temperature mean, 22·93 degrees, was + 3·18 above the average. It was never so high since 1859, when it was 23·17, and only in three other years of the 30 had February a higher daily-range than the present month, *i.e.*, 1857, 1856, 1841. The greatest range on any day was 34 degrees on the 19th, and that has often been exceeded in former years.

Solar intensity mean, 106·25 degrees, was — 1·62 below the average. The greatest on any day was 120, recorded on the 2nd and 19th, and the lowest since 1861. It is remarkable that the sun's heat should be so low while mean shade temperature was so high, more especially as the cloud mean was below the average.

Terrestrial radiation mean, 49·23, was only — ·34 below the average. The lowest in any night was 44·5 on the 10th. In every year recorded, except 1866, when it was the same, the minima have been much lower.

Elastic force of Vapour, 390, was + 16 above the average. It ranged from maximum 585 at noon on the 7th, to minimum 260 on the evening of the 14th.

Humidity mean, 65, was — 5 below the average.

Rain-fall amounted to 1·35 inches, being — ·34 below the average. It fell on 7 days, being — 0·73 below the mean. It descended copiously on the 7th and 25th, so as to scour surface drains and flush sewers and water-courses efficiently. *Snow* was never visible on Mount Wellington during the month.

Spontaneous Evaporation amounted to 4·22 inches, being three times more than rain fall.

Cloud mean was 5·08, being — ·62 below the average.

Ozone mean was only 5·61, being — 1·40 below the average, and the lowest ever registered for the month of February.

The *Electricity* records were :—21 positive with tension ranging from 2·5 to 6; and 32 negative, ranging from 1 to 6, and 3 "nils." A short storm of *thunder*, *lightning*, and rain occurred on the last day of the month.

The month's *Deaths* amounted to 42, being — 12 less than the average of the previous 14 years, and — 6 less than 1870 had. Under one year of age the deaths were 12, being — 2 less than 1870 had. At 1 to 5 years old the deaths were 7, being + 3 more than in 1870. At 5 to 10 there were no deaths, while 1870 had 2. At 10 to 15 no deaths occurred, though 1870 had 2. At 15 to 20 there were 2 deaths, while 1870 had none. From 20 to 60 the deaths were 10, while 1870 had 13. At 60 and all ages above, the oldest being 87, there were 11 deaths, while 1870 had13, the oldest being 82. *Zymotic* diseases caused 10 deaths, all from *Diarrhœa* and *Dysentery*, the prevalent diseases always at this season of the year. There were 4 *Inquests*. At the *Brickfields Invalid Establishment* there were 2 deaths ; at the *Cascades* 3. The *Hospital* had 6 deaths, two of them from other registration districts. Pulmonary *Consumption* caused 2 deaths, one being a native of England, the other of Ireland.

REPORT

OF THE

ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

1870.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM OFFICE, HOBART TOWN.
1871.

PATRON:

Her

Majesty

The Queen.

Royal Society of Tasmania.

Patron:

HER MAJESTY THE QUEEN.

President:

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HON. SIR R. OFFICER, M.H.A.	M. ALLPORT, ESQ., F.L.S., F.Z.S.

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J. DUNN, ESQ.	J. W. AGNEW, ESQ., M.D.

Auditors of Annual Accounts:

F. BUTLER, ESQ.	H. COOK, ESQ.

Auditors of Monthly Accounts:

M. ALLPORT, ESQ.	F. ABBOTT, ESQ.

Curator of the Museum:

MR. T. ROBLIN.

* Members who retire next in rotation.

Honorary Members.

HIS EXCELLENCY SIR GEORGE GREY, K.C.B., &c., Governor

CHARLES JOSEPH LATROBE, Esq., England.

Corresponding Members.

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JOHN JOSEPH BENNETT, Esq., F.R.S., British Museum, London.

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DR. W. O. SONDER, Foreign Hon. Sec. Society of Naturalists, Hamburg.

REV. J. J. BLEASDALE, D.D., F.G.S., Melbourne.

List of Fellows.

†Denotes Life Membership.

Abbott, Francis, F.R.A.S., F.R.M.S.	Hobart Town
Abbott, F., jun.	,,
Adams, G. P.	,,
Agnew, J. W., M.D.	,,
Allport, Joseph	,,
Allport, Morton, F.L.S., F.Z.S.	,,
Archer, William, F.L.S.	Cheshunt
Atherton, E.	Hobart Town
Atkinson, Rev. H. D.	Oyster Cove
Aubin, F.	Spring Bay
Aikenhead, Hon. J., M.L.C.	Launceston
Adams, R. P.	Hobart Town

Bilton, H.	Glenorchy
Barnard, James	Hobart Town
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Boyd, James, Civil Commandant	Port Arthur
Butler, Francis	Hobart Town
Butler, J.	Bagdad
Bromby, Right Rev. C. H., Lord Bishop of Tasmania	Hobart Town
Bright, R. S., M.R.C.S.L.	,,
Butler Henry	,,
Buckland H. J.	,,
Browne, Justin McC.	,,
Baynton, W. E.	Kingston
Bomford, F. E.	Rheban, Swansea

Chapman, Hon. T. D., M.H.A.	New Town
Cook, Henry, M.H.A.	Hobart Town
Clarke, J. M.	,,
Creswell, C. F.	,,
Cotton, Francis	Swanport
Crawford, Lieut.-Colonel	New Town

Cruttenden, Thomas	Woodsden
Castray, L. R., A.C.G.	Hobart Town
Davies, Ven. Archdeacon	Hobart Town
Davies, John, M.H.A.	,,
Dear, R. E.	,,
Dobson, Hon. W.L., M.H.A.	Hobart Town
Dobson, H.	,,
Dunn, J. A.	,,
Du Cane, His Excellency C.	Government House
Foster, Hon. John, M.L.C.	Hobart Town
Giblin, Thomas	,,
Gould, C., F.G.S., Government Geologist	,,
Gorringe, Thomas	Green Ponds
Greig, C. F.	Hobart Town
†Gunn, R. C., F.R.S., F.L.S.	Launceston
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†Gellibrand, W. A. B.	River Ouse
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Hinsby, Henry	,,
Hunter, Henry	,,
Huston, G. F.	New Norfolk
Huybers, A.	Hobart Town
Hopkins, H.	,,
Hazell, C.	Carlton
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Jackson, Adam	Ross
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Jeffery, Molesworth	Bournbank
Kennerley, Hon. Alfred, M.L.C.	Hobart Town

Knight, W., jun.	Sandy Bay

Langdon, Captain the Hon. W., R.N., M.L.C.	Montacute
Lewis, David, M.H.A.	Hobart Town
Legge, R. V.	Cullenswood

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Macfarlane, James	Hobart Town
Macfarlane, J.	,,
Mather, J. B.	,,
Maxwell, C. M.	,,
†Milligan, Joseph, F.L.S.	England
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Meredith, Hon. C., M.H.A.	Hobart Town
Morrison, Askin	,,
Marsh, H. J.	,,
Mace, J. C.	Clarence Plains
Mace, G.	Spring Bay

Napier, G. R.	Hobart Town
Nelson, H.	,,

Officer, Hon. Sir Robert, M.H.A., Speaker	New Norfolk

Pillinger, J.	Antill Ponds

Roberts, H. L.	Hobart Town
Read, R. Cartwright	Redlands, New Norfolk.
Rule, J.	Bellerive

Salier, G., M.H.A.	Hobart Town
Sharland, W. S., M.H.A.	New Norfolk
Solomon, Joseph	Hobart Town
Stephens, T., M.A., Inspector of Schools	,,
Story, J. F.	Swanport
Storie, Rev. J.	Hobart Town
Susman, L.	,,
Stone, W.	,,
Swan, E. D.	,,
Scott, J., M.H.A.	Launceston

Scott, J. R., M.H.A.	New Town
Travers, S. Smith	New Town
Walch, James	Hobart Town
Weaver, G.	,,
Weston, W. P.	Norfolk Plains
Whitcomb, G.	Hobart Town
Whyte, Hon. James, M.L.C.	,,
Wilson, George, jun.	Mount Seymour
Wilson, Hon. J.M., M.L.C.	Hobart Town
Wise, F. H.	,,
Woolley, J.	,,
Wilkins, A.	England
Webster, A. G.	Hobart Town
Wright, Stephen P. H.	,,
Wilson, George	,,
Willes, C. J., M.R.C.S. Edin.	Oatlands
Walker, F. T.	Rhodes
Young, Russell	Hobart Town
Young, James	Bellerive

MINUTES of the ANNUAL GENERAL MEETING of the ROYAL SOCIETY OF TASMANIA, held at the Museum, Macquarie-street, at 7 o'clock p.m., on the 30th January, 1871: The Ven. Archdeacon Davies, Vice-President, in the chair.

The CHAIRMAN having read the advertisement by which the meeting had been convened, called upon the Secretary to read the report.

The Report for 1870 was then read.

It was moved by Mr. H. BILTON, seconded by Mr. J. ALLPORT, and carried, "That the Report be adopted, and printed for circulation amongst the Fellows."

Messrs. J. M. Clarke and F. Abbott, junr., having been appointed Scrutineers, the meeting proceeded to the election of four members of Council in place of those retiring.

The ballot resulted in favour of the undermentioned Fellows, who were declared duly elected:—

F. ABBOTT, ESQ.
T. GIBLIN, ESQ.
JUSTIN MCCARTHY BROWNE, ESQ.
A. G. WEBSTER, ESQ.

Messrs. F. Butler and H. Cook were, on the motion of Mr. M. ALLPORT, seconded by Mr. F. ABBOTT, Senr., re-elected Auditors of annual accounts.

The following gentlemen, who had been previously nominated by the Council, were elected by ballot as Fellows of the Society:—

Molesworth Jeffery, Esq., of Bournbank, and W. E. Baynton, Esq., of Kingston.

A vote of thanks to the Honorary Secretary, Dr. Agnew, proposed by Mr. J. ALLPORT, and seconded with some complimentary remarks by Mr. STEPHENS, was unanimously adopted.

Dr. AGNEW returned thanks. He was much gratified at being able to report that the financial condition of the Society was so comparatively satisfactory, and he hoped by the invaluable assistance of their Curator, Mr. Roblin, to be able next year to state that all liabilities had been cleared off. This was much to be desired, as it was becoming a matter of necessity that some portion of the funds should be devoted to the purchase of recent books of reference, etc., and to other objects connected with the Institution.

On the motion of Mr. BELSTEAD, seconded by Mr. J. M. CLARKE, an unanimous vote of thanks was accorded to the Chairman.

The CHAIRMAN returned thanks, remarking that he considered it would be desirable to have a microscopical reunion at an early date for the special entertainment of ladies; and stating that, in conformity with a suggestion made by Mr. Giblin at the last annual general meeting, he purposed giving an address next year, should he then have the pleasure of occupying his present position.

The proceedings then terminated.

REPORT.

The Sesssion of 1870 commenced on the 8th of March, with a paper by Baron F. Von Müeller, C.M.G., F.R.S., etc., entitled "Contributions to the Phytography of Tasmania," and the following papers were read at the meetings during the year:—"Additional Observations on the changes which have taken place in the Star η Argus and its surrounding Nebula," by F. Abbott, F.R.A.S.; "On the Land Shells of Tasmania, with a list of new species," by Mr. W. Legrand; "On the habits of the large Crayfish (*Astacus sp.*) of the Northern Rivers of Tasmania," by C. Gould, Esq., F.G.S.; "Notes on an Excursion to Cummings's Head and the Falls of the Meander," by W. Archer, Esq., F.L.S.; "Notes on an Experiment with the Fumes of Sulphur, and on other methods for the Destruction of Rabbits in their Burrows," by W. Archer, Esq., F.L.S.; "Notes on the Salmon Trout (*Salmo trutta*) at the River Plenty," by M. Allport, Esq., F.Z.S., F.L.S.; "The Sun and its Office in the Universe," by F. Abbott, Esq., F.R.A.S.; "Continuation of Notes on an Excursion to Cummings's Head and the Falls of the Meander," by W. Archer, Esq., F.L.S.; and "Notes on the Californian Thistle," by the same author.

In addition to the papers read, the following subjects were brought under discussion at the monthly meetings:—"The occurrence of Gold at Port Cygnet;" "The Red Spider of the Hop Grounds;" "The Smolt captured in the Derwent and forwarded to Dr. Günther for identification of Species;" "The arrest of development of the Salmon when detained in fresh water;" "Dr.

Günther's opinion as to species of the Smolt sent to him;" "The Caterpillars by which the grain and other crops were so much injured in the early part of 1870;" "The Manufacture of Beet-root Sugar in Tasmania, with correspondence thereon;" "The capture of a Smolt by an angler at New Norfolk; "Coal from Three Hut Point;" "The rapid growth of the English Perch (*Perca fluviatilis*) in Tasmania," etc., etc.

The monthly Meteorological Tables have been regularly published, and copies of them forwarded to the Government Observatories in the neighbouring colonies, from all of which similar returns have been received. The thanks of the Society are again due to Mr. F. Abbott of Hobart Town, Mr. J. Boyd of Port Arthur, Dr. Story of Swansea, and Mr. F. Belstead of Westbury, for their trouble in keeping these important records; also to the Superintendents of the various Lighthouses and Coast Stations, who, by direction of the Marine Board, furnish monthly returns.

The Council has much pleasure in reporting that the monthly "Notes on the Meteorology and Mortality of the Hobart Town Registration District," by E. Swarbreck Hall, Esq., have been regularly supplied and printed during the year.

Our transactions have as usual been transmitted to learned Societies in various parts of the world, and the Fellows will no doubt have observed, by our acknowledgments at the monthly meetings, that very valuable presentations have been received in return.

In order to aid in the advancement of the objects of the Society, it was thought advisable to make an appeal to the public for such increased assistance as they might be enabled to afford, whether by scientific contributions, or by joining as permanent members. The results have been such as to justify us in still keeping the subject under notice during the present year.

COUNCIL.

No vacancy has occurred during the year. The required list according to Rule XXXII., as amended at the General Meeting of 1868, has been exhibited in the Library for the last fortnight.

FINANCE.

On reference to last year's Report it will be noticed that it was expected our debt would be considerably reduced at the end of the current year. We are happy to say such has been the case, and the state of the Balance Sheet warrants us in hoping that the debt will almost be extinguished by the end of the present financial year.

The total income from all sources was as follows:—Government Grant to Museum £200; to the Gardens £400; subscriptions £127 10s.; sale of Plants, etc., £71 3s. 4d.; amounting to £798 13s. 4d. This with £30 12s. in the hands of the Superintendent of the Gardens for payment of current expenses, 9s. petty cash in hands of Curator of Museum, and £40, which we calculate will be available from arrears of subscriptions, will give a grand total of £869 14s. 4d. The expenditure and liabilities amount to £899 11s. 4d., leaving a balance to debit of £29 17s.

As the following statement shows, the current expenditure for the year has been well within the income:—

	£	s.	d.
Total Receipts from all sources	798	13	4
Total Expenditure	757	11	8
Balance for meeting liabilities	£41	1	8

GARDENS.

In the upper part of the Gardens considerable progress has been made in laying out and planting the trenched ground, through which a broad walk has also been carried. This walk will be continued round the beach as soon as the necessary tract of ground has been reclaimed by the sea wall now in process of erection. It is hoped that this wall will be completed in the course of a few months, and when the arrangements now in progress are fully carried out, this portion of the Gardens will no doubt become exceedingly attractive.

Preparations for the erection of a new boundary fence have been commenced by the Government. About two-thirds of the necessary quantity of cut timber has been received from Port Arthur, and as soon as the remainder arrives the work will be proceeded with as rapidly as possible. It is hoped that arrangements will be made at the same time for the construction of a new entrance, more in keeping with the general character of the grounds than the present one, which is most inconvenient and unsightly.

Owing to the very low state of our finances, and consequently the want of a proper organisation for the collection of suitable plants, our exchanges with Europe are gradually falling of, and the additions to our plant stock during the past year have chiefly been received from the neighbouring colonies. To Baron Von Müeller, Director of the Botanic Gardens, Melbourne, and C. Moore, Esq., Director of the Botanic Gardens, Sydney, we are indebted for many valuable additions of which the following are worthy of special notice:—A valuable collection of Tea,—Cinchona,—various Oaks, including the Cork Oak,—Coniferæ of economic value,—Hickory and Walnut plants. The above were sent by Baron Von Müeller as test plants to prove the adaptability of Tasmania for their cultivation on a larger scale. Several new Palms, which were discovered by himself on Lord Howe's Island, were sent by Mr. Moore. Among them the *Kentia Balmoreana*, *K. Forsteriana*, *K. Canterburyana*, &c., *Panax Murrayii* (the Palm Panax), *Eucalyptus citriodora* (the Lemon-scented gum), *Laurus cinnamomum* (the Cinnamon tree), and many others equally interesting. About 250 new plants were received during the year.

The number of persons who visited the Gardens during the year is estimated at 21,444.

MUSEUM.

As will be seen by the list of presentations many specimens in various departments of Natural History have been received during the year. All of these for which room could be provided have been arranged in their appropriate sections of the collection, the remainder being placed in store until additional case room, of which we are greatly in want, has been procured.

The spirit preparations in store have largely increased, but, as our funds are not at present adequate to meet the expense of mounting them for exhibition, the most that can be done for some time will be to provide sufficient spirits of wine to preserve them.

The collection of skeletons of native animals has received many additions at the hands of Mr. Roblin, and it is hoped that the majority of these will be placed in the Museum during the ensuing year.

Conchological specimens have been received from several donors, but as they are principally duplicates of those already in the Museum, they will be chiefly valuable for purposes of exchange. Mr. W. Legrand, to whom the Society is indebted for many additions to this department, is arranging a complete series of Tasmanian land shells, including all those recently discovered by himself, and it is his intention to present the collection when completed to the Museum.

The work necessary for the preservation of the general collection, which requires much time and care, has been carried out. Several alterations have been made in various parts of the Museum for the better display of the objects exhibited, and the work of labelling is being proceeded with as opportunities occur. Specimens have been sent to the Museum of Magdalen College, Cambridge; and Brussels, from which places we shall doubtless receive others in return.

The number of visitors during the year was 8718.

STATEMENT of the Funds of the ROYAL SOCIETY OF TASMANIA for the Year 1870.

RECEIPTS.	£ s. d.	£ s. d.
Annual Subscriptions from 76 Members	114 0 0	
Arrears of ditto	13 10 0	
Total Royal Society		127 10 0
MUSEUM.—Grant-in-aid from Treasury	200 0 0	
Total Museum		200 0 0
BOTANIC GARDENS.—Proceeds of Sale of Plants, Fruits, &c.	71 3 4	
Grant-in-aid from Treasury	400 0 0	
Total Botanic Gardens		471 3 4
1871.—Jan. 17.—Balance overdrawn at Commercial Bank		61 12 10
		£860 6 2
Note.—Dr.—To overdrawn Balance at Bank	61 12 10	
Balance of Account due Orger and Meryon, London	19 5 2	
Wheatley and Co., to 31st December, 1870 (not received) estimated at	20 0 0	
Total		100 18 0
Cr.—By Cash in hands of Superintendent of Gardens	30 12 0	
Ditto Curator of Museum	0 9 0	
Subscriptions due	40 0 0	
		71 1 0
		£29 17 0

EXPENDITURE.	£ s. d.	£ s. d.
Balance overdrawn at Commercial Bank, as per statement for 1869		82 4 4
Interest on overdrawn account, 1870, as per Bank Book		5 10 2
ROYAL SOCIETY.—Meteorological Instruments	3 14 1	
Printing and Advertising	34 4 2	
Postage, Parcels, &c.	3 11 7	
Collector's Commission on Subscriptions received, £127 10s., at 5 per cent.	6 7 6	
Messenger for delivering Papers and Proceedings	0 15 0	
LIBRARY.—Books and Stationery	42 17 6	
Total Royal Society		93 9 10
MUSEUM.—Salary of Curator	125 0 0	
Wages of Attendant	52 0 0	
Insurance	6 7 6	
Purchase of, and preparing specimens	2 16 0	
Water Rate	3 3 0	
Fuel and Light	3 16 7	
Sundries and Petty Cash	1 5 6	
Camphor, Spirits of Wine, &c.	9 2 8	
Carriage of Specimens	0 9 6	
Fittings, Repairs, &c.	3 15 0	
Ironmongery, &c.	3 0 9	
Sweeping Chimneys	0 7 0	
Total Museum		211 3 6
BOTANIC GARDENS.—Salary of Superintendent	150 0 0	
Wages of Foreman and Labourers	276 5 0	
Tools and repair of ditto	10 6 1	
Freight and Carriage of Plants	3 4 0	
Stationery and Stamps	2 12 2	
Ironmongery	10 7 3	
Sundries	10 0 10	
Seeds	2 9 6	
Forage	2 13 6	
Total Botanic Gardens		467 18 4
		£860 6 2

February 2nd, 1871.

Audited and found correct { FRANCIS BUTLER / HENRY COOK } Auditors.

BOOKS PURCHASED & PRESENTED DURING 1870.

[*Presentations marked thus.**]

Arts, Journal of Society of, Vol. 17, Nos. 885 to 888 ; Vol. 18, Nos. 889 to 936 ; Nov. 5th, 1869 to Oct. 28th, 1870.
Arts, Transactions of Society of, 1 Vol., 1868-9.
Archiv fur Naturgeschichte, No. 6, 1867.
*Astronomical Observations made at Melbourne, 1866, 1867, 1868. From R. J. Ellery, Esq.
Athenæum, parts 502 to 513, October, 1869, to September, 1870.
*Agricultural Society of N.S.Wales, Journal of, current numbers.
*Academy, American of Arts and Sciences, Proceedings of, Vol. 7, page 343 to end.
*Builder, The, Nos. 226 to 237, October, 1869, to September, 1870.
British Association, Report of, 1868.
Birds of Australia, Gould's, supplement, Part 5.
*Calendar of Science and Art Department, South Kensington Museum, 1870.
*Climate of London 1818-1820—two volumes.
*Catalogue of Victorian Exhibition, 1861.
*———— of Maps of British Possessions in India.
*———— of Colonial Museum, Wellington, New Zealand.
*———— of Victorian exhibits to Sydney Exhibition.
Conchologia Iconica. Parts 282, 283.
Crayfish, On the habits of the large Freshwater, of Northern Rivers of Tasmania. From the Author, C. Gould, Esq., F.G.S.
*Essex Institute, Salem, Massachusetts, America, Proceedings of, Vol. 5, Nos. 5 to 8.
*Earthquakes, Cause and Phenomena of, by the Rev. W. B. Clarke. From the Author.
*Entozoa, Cobbold's. From the Government.
*Excursion to Cummings's Head, and the Falls of the Meander, Notes on an, by W. Archer, Esq., F.L.S. From the Author.
Florist and Pomologist, Nos. 23 to 34, November, 1869, to October, 1870.
Gardeners' Chronicle, The. Current numbers.
*—————— of New Zealand, from the author, F. Wakefield, Esq., F.L.S.
*Geological Charts of Tasmania, North East Coast. By C. Gould, Esq., F.G.S.
*Intelligencer, Walch's Literary, current numbers.
Journal, Silliman's American of Science and Art, Vol. 48, Nos. 144, 145 ; Vol. 49, Nos. 146, 147 ; vol. 50, Nos. 148, 149.
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*Rot in Sheep, by J. B. Simonds. From R. C. Gunn, Esq.
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*————— Tasmania, 1869.
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*Star η Argus, Additional observations on changes in, 1870, by F. Abbott, Esq., F.R.A.S. From the Author.

*Sulphur, Notes on an Experiment with the Fumes of, for destruction of Rabbits in their Burrows. By W. Archer, Esq., F.L.S. From the Author.

*Salmon Trout, Notes on. By M. Allport, Esq., F.L.S., F.Z.S.

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*Shells, Land, of Tasmania, Notes on. By Mr. W. Legrand.

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*Tasmania in 1870, by H. M. Hull, Esq. From Geo. W. Rex.

*Trade, Free Intercolonial, pamphlet. By D. Randall, Esq., Adelaide.

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*Tasmanians, Last of the. By James Bonwick, Esq., F.G.S. From Dr. Milligan.

*————, Daily Life of. By James Bonwick, Esq., F.G.S. From Dr. Milligan.

*Thistle, Californian, Notes on. By W. Archer, Esq., F.L.S.

LIST OF PRESENTATIONS TO MUSEUM DURING 1870, WITH NAMES OF DONORS.

Allport, M., Esq.—Insects in spirits, from Port Arthur. Part of Skull of Tunny, from North Coast of Tasmania. A Rail *(Rallus Lewinii).* Prawns taken from stomachs of Rock Cod. Schorl from Flinders' Island, and a Mass of Resin washed on shore at the same place. Two Fish, caught in the Derwent. [See *Emmelichthys nitidus* in Zool. of Erebus and Terror, page 47, plate 29]. A Black Snake. A Fox Shark, or Thresher.

Allison, F., Esq.—A Pair of Mexican Spurs.

Atkinson, Rev. H. D.—Specimen of *Ibacus Peronii.* A Spider Crab. Eleven specimens of Echinodermata.

Abbott, J., Esq.—Coal from Rookwood, Three Hut Point.

Bayley, Master E.—A Falcon *(Falco frontatus).*

Butler, J., Esq., Dunedin, per J. W. Graves, Esq.—A femur of the Moa *(Dinornis sp.)*

Brand, Mr., Oatlands, per the Hon. J. Whyte, Esq.—A fœtal Wallaby.

Baynton, Mr. W. E., Kingston.—Land Shells, Crustacea, &c.

Butler, F., Esq.—Four specimens of Silver Ore from Penguin Creek.

Butler, J. J., Esq.—An English Perch, from Bagdad.

Crouch, Mrs. S.—A collection of Weapons, &c., from Fiji, viz. :—1 Pillow, 2 Pieces Tappa Cloth, 1 Female Chief's Dress, 1 Paddle, 2 War Clubs, 1 Piece Samoan Cloth, 1 Sandwich Island Spear, 1 Spear, Skull of Porpoise, Fœtal Porpoise.

Chisholm, Mr. D.—A large Fungus from a Gum Tree.

Cole, Mr. W.—1 Spanish Silver Coin, Carolus III., 1781. 1 Half Dime, United States, 1854. 1 Brass Coin, Louis XVI. of France, 1792. 1 Silver Coin.

Chapman, Mrs.—Seeds from Borneo.

Clinch, Capt.—Jaw of Cestracion, or Port Jackson Shark.

Cook, H., Esq.—A Treatise on Tobacco, 1621.

Cearns, Mr.—Specimens of very large Oysters from North-West Bay.

Dinham, G., Esq.—Two Stone Hatchets of Aborigines of Australia and Tasmania. Portion of Skull of Aborigine from Mona Vale. A Fossil Seed from the Sandstone, Somersetshire, England, found 80 feet below the surface. A Collection of Mineral specimens from England. A copy of "The whole Workes of W. Tyndall, John Frith, and Dr. Barnes," 1573.

Degraves, C., Esq.—Four Fossils from the Limestone at Cascades.

Docksey, Mr.—Three Mineral specimens from Adelaide.

Davies, Mr. G.—Chicken with four legs.

Exton, Mr., Oatlands.—A Rail *(Rallus Lewinii)*.

Edwards, Mr., Oatlands.—A White Kangaroo.

Edwards, Mr., Kewstoke.—A very large specimen of Cornelian.

Forsyth, Captain, brig Waverley.—A Snake and a Lizard from Java.

Forster, J., Esq.—Part of Human Skeleton dug up at Hamilton.

Graves, J. W., Esq.—2 Skulls of Axis Deer from Slopen Island. A Nest of the English Sparrow. A Black Snake. A Cape Barren Goose *(Cereopsis Novæ Hollandiæ)*. A Sparrow Hawk.

Giblin, Mr. R.—A Fish said to have been caught in Mr. Walker's Mill-Race (?).

Gellibrand, T. L., Esq.—A Wedge-tailed Eagle.

Giblin, T., Esq.—A list of subscribers, with signatures, to a testimonial for presentation to Mr. Taylor, of Macquarie River, for resisting an attack on his house by escaped convicts, dated 20th July, 1824. Paper-like Bark of Tea Tree.

Gulliver, Mr. G.—125 specimens of Australian Coleoptera, named.

Gresley, Mr. C. A.—Rock Specimens from River Mersey.

Gibbons, Mr.—A Chicken with four legs.

Hedberg, Mr. O. H.—A collection of Swedish Coins and Notes.

Hopkins, H., Esq.—A fœtal Lamb, a monstrosity. Two Dories.

Hull, H. M., Esq.—Specimen of Iron Pyrites and Malachite. Shells, &c., from Warrnambool. Nest of White-shafted Fantail.

Hedberg, Mr. O. E.—Jaws of Shark.

Hutchison, Rev. J.—A Hermit Crab.

Herpich, Mr.—Three Austrian Notes. Five Turkish Coins. One Austrian and two Hamburg Coins.

Ikin, Mr.—Two Spines of Sting Rays. Twelve specimens of Crustacea.

James, Mr. R.—Part of Skeleton of Ray (?). Jaw of Cestracion.

Jeffrey, Mr. R. A.—Two very Large Mussels, from near New Wharf.

Johnston, Mr. W.—A Bronze-winged Cuckoo.

Knight, W., Esq., junior.—Samples of Cinnabar Ore from Cudgegong, New South Wales.
Leake, J. T., Esq.—A specimen of Roman Brick from St. Alban's, England (the ancient Verulamium).
Luttrell, Mr.—Specimens of Quartz from Tomahawk River and Waterhouse. Crabs from N. Coast.
Lewis, Mr. Gidley.—A Russian Silver Coin of Empress Catherine, 1796. Specimen of Handwriting of General Moreau.
Low, Mr. J. I.—A Black-cheeked Falcon.
Lloyd, Captain, per Mr. O. H. Hedberg.—A Shingle of Macquarie Harbour Pine, from the gaol at Macquarie Harbour built in 1826.
Mayson, Miss H., and Mitchell Miss J.—A Collection of Shells from East Coast, Tasmania.
Marum, Very Revd. Archdeacon.—Fossils from near the Dromedary Mountain, Tasmania.
Museum, Australian, Sydney, Trustees of.—Part of Skull of Fossil Sarcophilus from Wellington caves, N.S. Wales. Eight photographs of *Ceratodus Forsteri.*
Müeller, Baron F. Von.—Skeleton of White Swan.
Makepeace, Mrs., Swansea.—Four specimens of Echinodermata.—Egg cases of *Fasciolaria sp.*
McKenna, Mr.—Living specimens of Gordius from New Town rivulet.
Maclanachan, Hon. J., Esq., a Carolina Drake. A Peacock curiously marked.
Maum, Mr. W.—A Copper Medal, apparently Masonic.
Moir, Mr., jun.—Native Alum from near Brown's River.
Milligan, Dr.—Copies of Bonwick's "Last of the Tasmanians," and "Daily Life of Tasmania."
Nicholas, A., Esq.—Fossil Spatangus from New Zealand.
Neilson, Mr. A.—A very large specimen of the common Slug.
Nelson, Mr. H.—Sample of Coal from Greymouth, New Zealand.
Officer, Sir R.—A Platypus.
Propsting, Mr. R.—A Swamp Hawk.
Plunkett, Mr.—Mittens made by the Esqimaux of Behring's Strait.
Pybus, Mr. R., Bruni Island.—A Crown Piece of Charles II., 1677.
Paisley, Mr.—A Cuttle Fish.
Parker, Mr. T.—Auriferous Quartz from Pioneer Reef, Waterhouse.
Pearsall, Mr.—A Chestnut-faced Owl.
Pelham, Mr.—A Fish picked up on beach at Kangaroo Point.
Philip, Mr.—Part of Vertebra of Whale.
Price, Mr. W. H.—A Ram's Head with four horns.
Rex, Mr. Geo. W.—The Crop of a Fowl containing an entire Whip-snake.
Roblin, Mr. T.—Specimen of *Aplysia sp.* from Cornelian Bay.
Read, R. C., Esq.—A Native Devil *(Sarcophilus ursinus)*, with three young in pouch.
Robinson, Captain, barque "Free Trader."—A sample of Bituminous Coal from a new seam at Newcastle, New South Wales.
Robertson, Mr. R.—A large bony mass from a horse's jaw, which had been previously fractured.
Smith, Mr. F.—Specimen of *Aplysia*, from Brown's River.
Smith, Mr. G. J.—Piece of Native Box Wood, *(Bursaria spinosa)* with thorns embedded in its substance.
Smith, Mr. W.—A Flounder, curiously marked.
Smith, Mr. J., Brig "Waverley."—Snakes, Lizards, &c., from China.
Serckoff, Captain, H.I.M's. Corvette "Boyarin."—A collection of Russian Coins, viz., 1 Gold, 5 Silver, and 9 Copper.

Spurling, Mr.—Specimen of the *Chimæra Australis,* caught in the Derwent.
Salmon Commissioners.—A Salmon Parr from the breeding ponds, River Plenty.
Scott, J. Esq., M.H.A.—Cast skin of Snake, from Ringarooma.
Tapfield, Mr. M.—A specimen of Gorgonia, with a species of *Astrophyton* attached.
Turner, Mr. H.—A Persian or Hindoo copper coin.
Weber, Mr. M.—A War Club from Fiji.
Weaver, Mr. G.—A Musk Duck.
Warren, Captain R.E.—Feet of Cariboo Deer.—Mocassins made from hocks of Moose Deer.
Wintle, Mr. S. H.—Two specimens of Granite from the Tomahawk River. Fossil ripple marks in sandstone, from Southport. 20 Geological specimens from New South Wales and Victoria.
Wood, Mr. A.—A very curious Crustacean from Blackman's Bay.
Williams, Captain.—A Cuttle Fish from East Coast.
Wise, Mr. F.—A Smolt caught by an angler at New Norfolk.
Young, Mr. James.—A Spider Crab. Human Skull from Fiji. Jaws of Port Jackson Shark (*Cestracion*).

PLANTS SENT FROM THE ROYAL SOCIETY'S GARDENS DURING 1870, CHIEFLY TO PERSONS RESIDING ABROAD.

March 15th.—To the Sydney Botanic Gardens.—One Case containing 61 plants.
March 21st.—To Mr. E. B. Heyne, Seedsman, Adelaide.—Collection Seeds and Bulbs.
March 29th.—To Mr. F. Terry, Government House, Brisbane.—Seven species Tasmanian Ferns.
June 1st.—To Mr. G. Brunning, Nurseryman, Melbourne.—Twenty-one plants, 12 packets seeds.
June 1st.—To Mr. J. Harris, Nurseryman, Melbourne.—Thirteen plants, 12 packets seeds.
June 10th.—To the Botanic Gardens, Sydney.—One Case containing 76 plants.
July 13th.—To B. F. Laurie, Esq., Encounter Bay.—One hundred Morus alba.
July 16th.—To Messrs. Toole and Co., Nurserymen, Dublin, Ireland.—Ten packets seeds.
August 17th.—To Messrs. Taylor and Sangster, Toorak Nursery, Melbourne.—Twenty-five plants, 10 packets seeds.
August 17th.—To Ferd. Von Müeller, Director, &c., Botanic Gardens, Melbourne.—29 plants, 11 packets seeds.
August 17th.—To Mr. G. Brunning, Nurseryman, Melbourne.—7 plants, 3 packets seeds.

PLANTS AND SEEDS SUPPLIED FOR THE DECORATION OF PUBLIC PLACES, DURING 1870.

April 25th.—For Castray Esplanade.—Collections of Creepers.
June 2nd.—For planting Church grounds, Bothwell.—Seventy plants.
June 3rd.—For planting Agricultural Society's grounds. Evandale.—Seventy plants, Collection Roses, 12 packets seeds.
June 14th.—For planting in the Franklin Square.—15 plants, 10 plants.
June 20th.—For planting at Hospital for Insane, New Norfolk.—Eighty plants.
June 21st.—For planting round the foundation of Public Buildings, Macquarie-street.—Seventy three plants.
June 24th.—For plantation at Cascade Factory, Upper Macquarie-street. Sixty-three plants.
June 30th.—For planting about grounds of Government House.—Fifty plants.
July 1st.—For planting avenue of Military Barracks.—Thirty-six plants.
July 11th.—Mr. J. Archer, for church grounds, Longford.—Fourteen plants.
July 12th.—For planting grounds of St. Michael's Church, New Norfolk.—Fifty-four plants.
July 12th.—For planting ground at Macquarie-street entrance to Domain. —One hundred and twenty plants
July 30th.—For planting at Castray Esplanade.—Thirty-two plants.
July 30th.—For planting about grounds of Government House.—Fifty plants.
August 5th.—For planting grounds at Colonial Hospital.—Sixty-four plants.
August 11th.—Ditto.—Thirty-three plants.
October 14th.—Mr. T. Reidy, for grounds at Gaol. Twenty plants, 36 packets seeds.

PLANTS AND SEEDS RECEIVED AT THE ROYAL SOCIETY'S GARDENS DURING 1870, CHIEFLY FROM PERSONS ABROAD.

April 25th.—From Mr. E. B. Heyne, Seedsman, Adelaide.—One hundred and thirteen packets seeds.
May 13th.—From Mr. Joseph Harris, Nurseryman, Melbourne.—One case containing 28 plants.
May 13th.—From Baron Von Müeller, Melbourne Botanic Gardens.—Three cases containing 153 plants.
May 23rd.—From the Sydney Botanic Gardens.—Two cases containing 74 plants.
May 24th.—From Mr. G. Brunning, Nurseryman, Melbourne.—One case containing 31 plants.
June 7th.—From Messrs. Toole and Co., Nurserymen, Dublin, Ireland. Twenty-four packets seeds.
June 24th.—From Mr. G. Brunning, Nurseryman, Melbourne.—Bundle containing 31 roses.
July 7th.—From Messrs. Taylor and Sangster, Toorak Nursery, Melbourne.—One box containing 26 plaints.
July 13th.—From Mr. C. F. Creswell, Hobart Town.—Twenty-four packets seeds received from Europe.

August 26th.—From the Melbourne Botanic Gardens.—Seeds of a new Palm *(Pthycosperma Alexandræ)*.

September.—From Dr. J. Milligan, London.—Collection Flower and Vegetable Seeds, 68 packets.

September 30th.—From Mrs. Woodin, Hobart Town.—Seeds of the Umbrella Pine received by her from China. *(Scradopitys verticillata.)*

December 10th.—From Mr. C. F. Creswell.—Azalea and Camellia plants.

December 31st.—From the Sydney Botanic Gardens.—One Case containing 43 plants.

F. ABBOTT, Jun.,
Superintendent R. S. Gardens.

PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1870.

Acanthus montana
Alocassia metallica
Alsophilla M'Arthurii
Alternanthera spathulata
Amaryllis reticulata
Areca rubra
Areca Baueriana
Asperula setosa azurea
Atherosperma micrantha
Bambusa stricta
Bannisteria chrysophilla
Bauhinia tomentosa
Beleperone oblongata
Berberis pallida
Blaberopus sericeus
Blandfordia flammea
Bœhimeria argenteda
Boronia megastigma
Botryodendron latifolium
Bryonopsis laciniatia
Calocasia macrorrhiza variegata
Cassia Brewsterii
Centaurea Fenzlii
Cistus lusitanicus
Cleidon verticillatum
Clerodendron Thompsonianum
Cocos plumosus
Cryptocarya oblongifolia
Cycas Preissii
Dactylis glomerata variegata
Datura Carthagenensis
Datura fastuosa
Datura humilis pl.
Dicksonia Youngiana
Dipteracanthus affinis
Dombeya mollis
Dorstenia maculata
Edwardsia chrysophilla
Elæocarpus Hinau
Elæodendron glaucum
Epacris grandiflora
Eranthemum tuberculatum
Ethionema græcum
Eucalyptus citriodora
Eucalyptus Preisiana
Eudiandra virens
Eugenia Brasiliensis
〃 Ventenatii
Fagus Carrownii
Ferula communis
Ficus columnaris
Ficus peltata
Flindersia maculosa
Fraxinus elliptica
Frenela cupressoides
Frenela verrucosa
Gardenia chartacea latifolia
Geranium crassifolium
Grevillea acanthifolia
Grewia denticulata
Hakea microcarpa
〃 pycnobotrys
〃 ulicina
Helicia ternifolia
Helipterum anthemoides
Hemicyclia australasica
Hibiscus Guilfoyleii
Hovea pannosa

Hydrangea japonica rosea
" japonica variegata
Incarvillea sinensis
Inga pulcherrima
Iresene Lindenii
Jambosa acida
Jasminum heterophyllum
Justicia Lindenii
Kentia Balmoreana
" Canterburyana
" Forsteriana
Lasiandra Fontanesii
Laurus Cinnamomum
Licuala peltata
Linaria tristis
Linum perenne roseum
Magnolia anonæ folia
Malpigia coccifera
Martynia proboscidea
Melathra scabra
Melicope ternata
Menyanthes trifoliata
Michellia champaca
Nephelium tomentosum
Octoclinus Macleayanus
Palava flexuosa
Panax Marrayii
Pandanus Fosterii
Pandanus spiralis
Papyrus antiquorum
Passiflora trifasciata
Pavia Californica
Pentas Kermessina
Pentstemon Jeffreyanum
Pentstemon ovatum
Phillyrea media
Phytolacca sylvestris
Phœnix sylvestris
Pinus Aucklandiana
" contorta
" Fremontiana
" Lambertiana
" palustris
" pandurata
Pittosporum Zealanicum
Plattycodon grandiflorum
Plectroma ventosa
Pleroma heteromala
Podalyria myrtifolia
Podocarpus pruinosus
Prumnopitys elegans
Pteris tricolor
Pterospermum lancifolium
Quercus bicolor
" lanata
Quintinia Sieberii
Ratonia tenax
Ruellia longifolia
Sanchezia nobilis variegata
Sansievera carnea variegata
Scolopia Brownii
Scutellaria Tranei
Stephania hernandifolia
Stipa pennata
Strobilanthus viscosus
Taxus baccata elegantissima
" umbraculifera
Tecoma grandiflora
Tarrietia Carrownii
Tatranthera ferruginea
Thunbergia javanica
Tilia argentea
Vanqueria lasiantha
Veronica diosmæfolia
Vitis capensis
" hypoglauca
Whitlavia gloxineoides
Wigandia Caracassana
Wigandia Macrophylla
Xanthorrhœa arborea
Xeranthemum purpureum
Zamia Preisseii
Rhododendron
" Gibsonii

CAMELLIA.

Aspasia
Atrorubens
Loweii

AZALEA.

Alba magna
Carininata
Duc d'Nassau
Holdfordii
Magnifica
Ponticum glauca
Refulgens
Rubra plœno
Smithii
Souvenir d'l Exposition

GERANIUM.

Bicolor
Celestial
Chief Justice
Emile Lemoin
Evening Star
Ephraim
Forestier
Madame Lemoin